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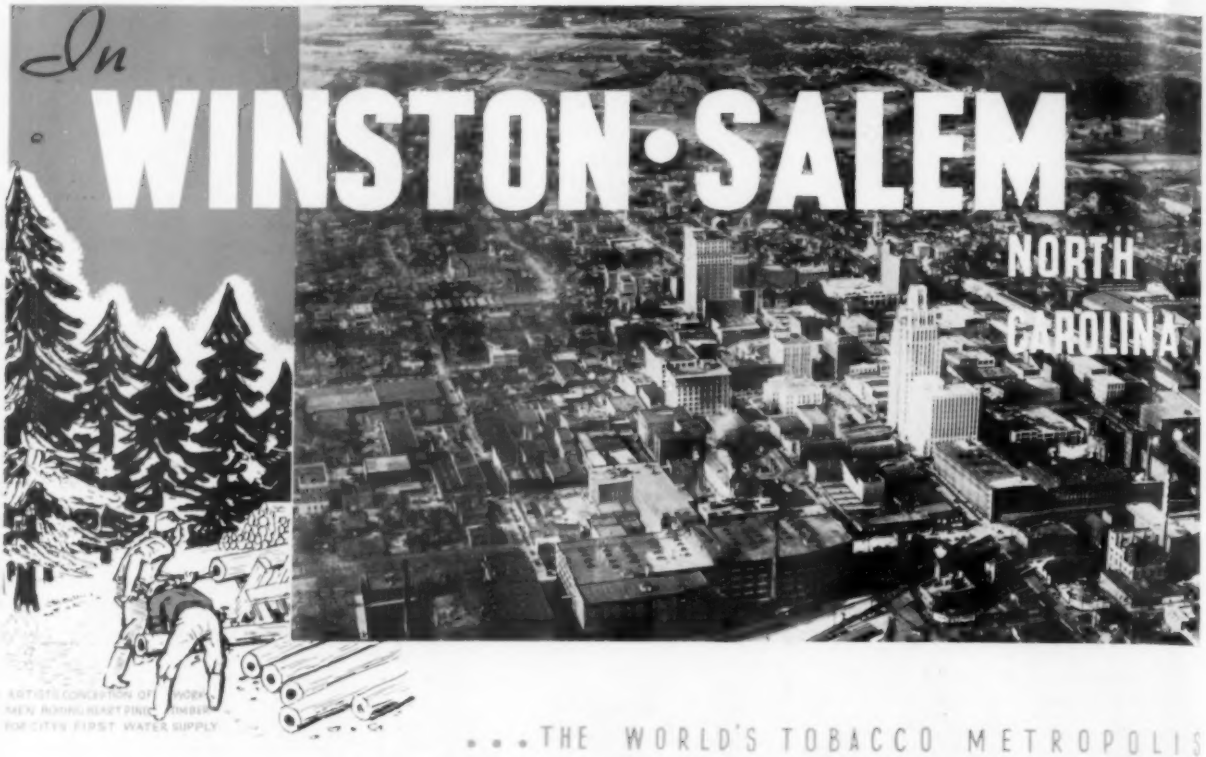


. . . THE WORLD'S TOBACCO METROPOLIS

WINSTON-SALEM, old in colorful tradition and historic buildings, modern in industrial development and supremacy, is located in the famous Piedmont section of North Carolina. From the day it was founded, 170 years ago, the community has combined an inquiring interest in all that was new with an appreciation of the already proved, into a practical progressiveness that has made it the industrial center of the Southeast.

Salem began on paper with a city plan that took into account such needs as water supply, sewerage and streets. The first water works system, completed on March 28, 1778, aroused the enthusiastic comments of President Washington when he visited the community on his presidential tour in 1791. From a good spring more than a mile away, water was brought by gravity to the main street, and thence distributed to various stations. The pipes were of the best heart pine timber, carefully hollowed, with the ends trimmed and fitted into each other. Terra cotta pipes were laid in 1828, when a triple pump and overshot power wheel were installed.

"Always in the van of progress" might well be the motto of this progressive Southern city that today, as well as yesterday, gives first thought to its pure and plentiful water supply. This comes today from two surface streams on parallel watersheds, with a normal dry weather flow of 2 M. G. D. on one, and 8 to 10 M. G. D. on the other.

Once measured by bucketfuls as it flowed from the wooden pipes, Winston-Salem's water supply is now checked by Pittsburgh Water Meters.

PITTSBURGH EQUITABLE METER CO.

MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA.

NEW YORK	LOS ANGELES	TULSA	HOUSTON	MEMPHIS	BUFFALO
COLUMBIA	KANSAS CITY	CHICAGO	PHILADELPHIA	ATLANTA	OAKLAND

Crime — Debt — Taxes

Improved Tools for Criminal Catching

FROM the "camera-eye cop," once relied upon to snare the roving criminal after one glance at a Rogues' Gallery picture, to modern fingerprinting and retinal records, motion pictures and hair microscopy, the science of criminal identification has made seven-league strides during recent years. The International Association of Chiefs of Police Yearbook 1936-37, first publication of its kind, lists these among the newly-developing tools for criminal catching:

1. *Increased acceptance of fingerprinting* and installation of the single fingerprint files, duplicates of which are collected by the Federal Bureau of Investigation in the Department of Justice in Washington, D. C. Over 6½ million such prints are now recorded. Wider education of identification officers in uniform interpretation and classification rules is possible through the annual "fingerprint" schools conducted by the F. B. I. and sponsored by the International Association for Identification.

2. *Photographing of evidence* to bring the scene of the crime to the courtroom. Pictures that show how a safe was rifled, how a burglar gained entrance, how a dead body was found, and signs of incendiarism, are all valuable for this purpose. They are also useful to detectives and members of the uniformed force, because most criminals develop an individual technique that is recognizable upon repetition. Motion-picture photography also is coming into use in the education of policemen. A list of police training films owned by the League of Kansas municipalities and rented to police chiefs of cities in the state, includes pictures of interior investigation at scene of crime; report of criminal operating methods; handling evidence; use of the polygraph (lie detector), and a study of the operation of car thieves.

3. *Microscopical and chemical analysis of the hair.*—Race of a criminal is easily determined by this means of identification. The subject's age can also be determined. Powder-burn tests of the hair sometimes are used to establish whether a death by shooting is murder or suicide.

4. *Eye-identification.* — This identification is based on the theory that the permanent blood-vessel patterns in the retina differ in each individual. There is a difference even between the right and the left eye of the same individual. The pattern of the veins is used for classification.

Despite increasingly expanded activities, police administrators are not satisfied with the present use of modern identification methods. Their self-criticism, according to the *Yearbook*, is that there is insufficient coordination among police departments, detective bureaus and the bureaus of identification. In many cities, not all persons arrested are fingerprinted, because personnel is inadequate, says one police officer. Another criticism is made that the full value of identification records, on a national as well as a local basis, is not understood.

Debt- and Expenditure-Control Measures

NO sleight-of-hand performance, but actual well-planned debt- and expenditure-control measures are putting cities with depression-deflated pocketbooks back on their feet financially, according to the experiences of three typical American municipalities, related in the May issue of *Municipal Finance*, magazine of the Municipal Finance Officers' Association of the U. S. and Canada.

Hackensack, N. J., a residential city of 28,000, New Rochelle, N. Y., a municipality of 54,000, and Oglesby, Ill., a town of 4,000, are the three. Failure to collect taxes and special assessments against property whose development was begun in boom times; failure to bond capital improvements on a long-term basis at a reasonable rate of interest; the mounting burden of relief loads; inability to borrow as a result of poor tax collections, and just plain poor accounting, are listed by these municipalities as the various causes for financial distress before they changed their ways.

Hackensack's big problem, relates City Auditor C. Robert Featherstone, was a large floating debt. In July, 1933, when the council-manager form of government went into effect, the city had approximately $1,000 in current cash to meet $56,000 in checks drawn but not issued, and teachers had gone unpaid for four months. The local banks were owed $657,000 on temporary loans and tax notes, the city's sinking-fund, $125,000, the county, $455,000 in past due taxes. After salaries had been cut and scrip issued to pay school teachers, a comprehensive plan to refund all temporary loan bonds then outstanding—$2,408,000—was drawn up. The plan called for the exchanging of these bonds for general refunding bonds with a schedule of maturity payments running from 1935 through 1949, the maturities so spread out as to cause an even annual tax levy. Estimated savings to the city by carrying out this plan amounted to from $25,000 to $30,000. To finance needed improvements in street and sewerage systems, borrowings were necessary, and in April this year the city floated a $580,000 bond issue with a maturity schedule of ten years to fund all existing tax notes.

Hackensack is now on a strict cash basis, with all operating expenses covered by current levies. The budget has been balanced, and with a reassessment project under way, the city does not expect to worry about further financing for some years to come.

New Rochelle, N. Y., needing extra money to pay current obligations and interest on bonded debt in 1933, found bankers' doors closed against pleas for loans, says City Auditor Edward J. Glick, because the city's uncollected taxes stood at 30 per cent. An Emergency Finance Commission working with the fiscal officers decided that a "cushioned" budget was the answer. In the 1934 budget the "cushion" consisted of a re-levy of uncollected 1931 and 1932 taxes amounting to $1,475,000. This procedure was repeated in subsequent years.

If the taxes are all collected, more cash is produced, consequently, than is actually necessary to operate the city for the current year. This goes into a "Current Reserve Account," which by December, 1936, contained $1,706,404.28 in cash. The plan is to peg the rainy-day account at $2,000,000, which may be reached this year. Taxpayers who pay promptly have had to bear the burden of this reform, but the cost to them is little compared with the results. The city is on a cash basis, and if the $2,000,000 surplus fund is preserved, it can stay there during any depressions to come. Beginning with 1938, when it is expected that further levies for the "cushion" can be eliminated, tax rates can be lowered and finally made uniform. The city is no longer dependent upon financial institutions for current loans.

The chief trouble with *Oglesby, Ill.*, according to City Clerk Edward Hand, was that for 30 of its 34 years of existence it had suffered from haphazard bookkeeping and slovenly accounts collection. Oglesby's "New Deal" was begun in 1931, when $14,000 in tax anticipation warrants were paid off and a rule laid down to issue no more. The fiscal year and the date of tax collections were harmonized, and a strict pay-as-you-go policy set up. Now no department spends more than the budget calls for. Detailed budgets are prepared for each city department, so that any commissioner or citizen can be told in a minute what has been spent at any time in the fiscal year by reference to a distribution ledger. Annual independent audits are made of both the clerk's and the treasurer's accounts. Among results: the city's funded debt has been reduced from $62,500 to $27,000; taxes have been lowered from $45,000 to $25,000 annually.

New Guidebook to Sound Tax Administration

PUBLICATION of a guidebook to efficient tax assessment has just been announced by the National Association of Assessing Officers as the result of a six-months study made by its special Committee on Principles of Assessment Practice. Charles D. Rosa, member of the Wisconsin Tax Commission, is Chairman of the Committee.

With the property tax in general, and assessment practice in particular, under close scrutiny during recent years, while undergoing numerous investigations by both public and private agencies, special significance is seen in the study. Listed are 80 principles which the Committee believes should be followed if efficient assessment work is desired. Among them are many refutations of the old conceptions of the assessor's job: that the small assessment district is preferable to the large one; that the assessor should be a local man; that compensation of the assessor may just as well be on a per diem, commission or fee basis as a yearly salary; that assessments need to be made no oftener than every two to seven years.

The report finds that too-small assessment districts are undesirable because they cannot employ the full-time services of properly trained assessors nor afford modern assessing devices in the way of mechanical aid. Modern techniques are seen as superior to the personal knowledge of an assessor who has lived for years in his territory, though he may know it like an old shoe. Payment of the assessing officer for the number of assessments he makes a day, smacks of a part-time job; commissions or fees are apt to result in hasty, careless work. Annual assessments are preferable, because their frequency gives opportunity to adjust whatever inaccuracies and inequalities occur, and a closer check is kept on all properties.

The Committee on Principles and Practice went to work in response to a recognized need on the part of the N. A. A. O. for reliable guideposts along the road to the efficient assessment of property. The study points out that it is not the assessor's job to concern himself officially with the social, economic or political effects of property taxation. It is his business to evaluate property properly and to interpret the tax legislation of his jurisdiction as it is written.

EXCHANGE
2368
SYMBOL OF SERVICE
This country's good telephone service did not just happen. It has been made possible by the organization and development of the Bell System.
BELL TELEPHONE SYSTEM
BELL SYSTEM

The Local Transit Problem

Citizens' Approval Brings Transit Dividends

CHARLES W. CHASE of Indianapolis Railways did it. Backed by his security holders, President Chase cut capitalization from $18,881,000 to $8,321,938; and fixed charges were reduced from $811,000 to $393,600.

The plan was to coordinate the several types of service, so that street cars would carry the heaviest traffic, gasoline buses to be on lines of lighter traffic and for feeders, and trackless trolleys for intermediate loads. With such cash as was available, a down payment was made on a million dollars' worth of new equipment consisting of 25 street cars, 15 trackless trolleys, and 30 buses, to be paid for in 60 monthly installments at 6 per cent interest. In *Forbes Magazine*, July 1, 1936, Lawrence Wingerter described the new equipment in language pleasing to the riding public.

The Customer Is Right

"The new cars and buses were equipped with all the latest comforts for passengers, luxuriously upholstered seats, improved lighting, linoleum-covered floors, and windows that could be raised without a crowbar. They were decorated in striking new colors of royal blue and canary yellow.

"Comfortable upholstered chairs were even furnished for car operators, and a new type of foot control was installed on street cars and trackless trolleys to make their work easier, and to provide faster and smoother acceleration. Car men were dressed in natty new uniforms and smart cadet caps of grey serge.

"The colorful new equipment spruced up the appearance of the city and the spirits of the citizens. The public showed its appreciation by riding to the tune of the following increases in revenue: 25 per cent increase on trackless trolleys, 10 per cent on street cars, 6 per cent on motor coaches.

INTERIOR OF A MODERN STREET CAR BUILT BY THE J. G. BRILL CO. FOR INDIANAPOLIS RAILWAYS

And Expresses Approval

"Letters poured in from enthusiastic patrons. Civic clubs requested extensions of the improved service. After a year's operation, it was estimated that the reduction in expenses and increases in revenue due to the new equipment would alone cover the annual payments on this equipment one and three-quarters times."

Heartened by public approval, the second step was initiated in September, 1933, consisting of *additional modern equipment:* 65 *new* street cars and 80 trackless trolleys. "Shining new equipment" was appearing generally, attracting citizens away from their automobiles. Then in 1935, an additional 31 gasoline buses were purchased, making a total of 246 new units.

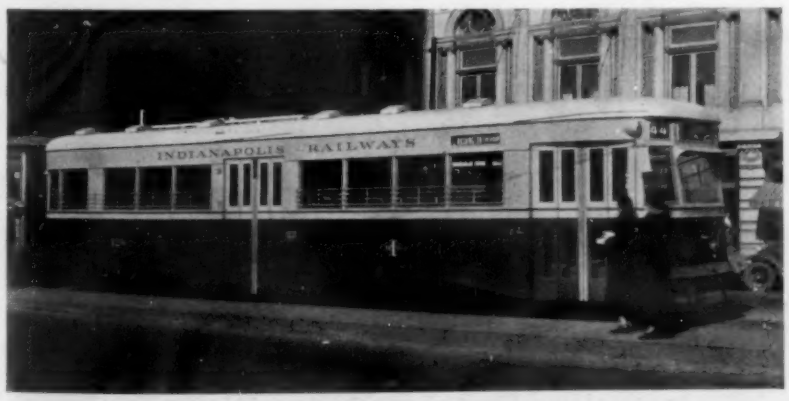
The Miracle

These improvements not only brought immediately increased revenues to the company (+5%), with decreased expenses (—11%), raised net operating revenue (+100%), and increased the schedule speed of the entire system (+20%), but these results and the spirit of accomplishment persuaded PWA to furnish a loan of $3,120,000 for the completion of the modernization program. This loan is a unique achievement in transit circles, and permitted the prompt construction of 25 miles of street-car track, and trackless trolley overhead lines, and the purchase of 57 trackless trolleys and 10 buses.

Here, then, is the plan consummated. At the start, in 1932, the new company emerged from the old receivership with rolling stock of the class of 1898. This shows what can be accomplished by a determined and forward-looking management—and a municipal government that did not place undue obstacles in the way.

The problem in all cities where improvements are needed is for the company to obtain increased revenues and lower costs so that it may build the credit with which to purchase modern equipment. Such equipment must come first in order to attract increased patronage and revenues. What city officials can do about this stalemate is to require that the company furnish a plan of what it would like to do if it were in a position to do it. The two heads might then get together to bend that plan to the facts of the existing system.

The city wants the system to be so good that all the people who could use it will use it. So does the company.



THESE INCREASED TROLLEY REVENUES TEN PER CENT

No city is too large to overlook the advantages of elevated storage

BUFFALO'S 3rd.

THE large illustration pictures the third of a series of three 2,000,000-gal. tanks installed at Buffalo, N. Y. Like its companion units, this latest installation —which serves the northern section—is of Horton radial-cone-bottom design. Locations were chosen to assure balanced distribution facilities in each section and by varying the height of each tank they are permitted to ride on the system and operate in one hydraulic plane.

Economical operation, uniformly satisfactory water supply and adequate fire protection are natural results at Buffalo from a system which permits even pumping, minimizes pressure variations, and creates an ample emergency surplus for the entire area.

Any large city may solve its similar problems by the installation of elevated storage tanks. For complete information address our nearest office.

2. *This, the second 2,000,000-gal. tank to be completed at Buffalo, serves the southern section.*

1. *This is the first 2,000,000-gal. tank to be completed. It serves the eastern section of the city.*

CHICAGO BRIDGE & IRON COMPANY

Chicago	2127 Old Colony Bldg.	Philadelphia	1616 "1700" Walnut St. Bldg.	San Francisco	1033 Rialto Bldg.
New York	3308-165 Broadway Bldg.	Boston	1501 Consolidated Gas Bldg.	Houston	2919 Main Street
Cleveland	2236 Rockefeller Bldg.	Birmingham	1502 N. Fiftieth Street	Tulsa	1625 Hunt Bldg.
Detroit	1501 Lafayette Bldg.	Dallas	1406 Liberty Bank Bldg.	Los Angeles	1403 Wm. Fox Bldg.

Fabricating plants in CHICAGO, BIRMINGHAM, and GREENVILLE, PA.

Selling Water and Keeping It Clean

Overcoming Opposition to Water Meters

EXPERIENCE and careful study have demonstrated beyond a doubt that where water meters have been introduced they neither restrict the use of water nor increase water bills. They produce results, not by restricting usage, but by preventing waste and leakage. Preventing waste and leakage does not mean curtailing or restricting any person in his accustomed use of water.

Notwithstanding its obvious advantages, there is generally a strong prejudice against metering wherever it has not been adopted. It is significant, however, that cities in which meters have been installed have not gone back to the former methods, the meters having proved satisfactory both to the municipality and to the consumers.

Landlords are generally among the opponents of meters, because they fear that their bills will be increased by the wasteful and careless practices of their tenants, but experience also has shown that this fear is not well founded; that the number of tenants who wilfully waste water is insignificant; and that, where the landlord has complied with the ordinances of the city requiring plumbing to be kept in repair, he has no reason for fearing that the installation of a meter will penalize him.

As with every other important innovation, it takes courage to make the first move, the first step, and the rest comes easy. Before a city goes into the installation of water meters on an extensive scale, it should make good use of printers' ink; use well-directed publicity, tell its story simply, graphically and honestly, and all opposition will vanish into thin air.

—From a paper by H. L. MEITES, Superintendent of Water, Chicago, Ill., presented before the American Water Works Association.

Increased Low-Lift Service for Omaha Water Works

THE Omaha, Nebr., Metropolitan Utilities District recently completed the installation of a 24-inch Fairbanks-Morse double-suction centrifugal pump direct-connected to a 600-hp slip-ring motor for pumping raw water out of the Missouri River into the sedimentation basins. This unit, in the low-service pump house of the Minne Lusa Station, has a capacity of 30 mgd against a total dynamic head of approximately 90 feet. The suction lift is 20 feet at times, but when handling 30 mgd against this suction, the pump meets its guaranteed efficiency of 87 per cent. The pump actually handled a maximum of 34 mgd on test.

Through its Metropolitan Utilities District, Omaha owns and operates its own water works, gas manufacturing and distributing system and ice manufacturing plant.

Plant Records Necessary, But They Should Not Enslave

DAILY plant operating records for water works should be so entered that the operator can quickly and easily compare for each unit the corresponding operations of other days, weeks, months and years. There is no way by which a standard or stock set of records can be used for all water plants, for each plant should have a system of records designed to fit its own needs. It is not a simple task to design an ideal set of operating records for a water plant, but it is worth the effort to do the job and do it well. Money spent in securing expert advice and assistance in designing and installing such records is certainly a wise and profitable investment for any plant.

A word of caution, however, is in order. In many offices, as in many plants, the staff members and employees are victims and slaves of systems instead of being masters of them, and much is lost thereby, both in dollars and otherwise. A proper system of plant operating accounting should be:

1. *Simple*, to the extent possible without sacrificing quality.
2. *Brief*, without sacrificing desired results.
3. *Illuminating*, so that it tells the needed story in language which can be understood by the plant employees.
4. *Accurate*, so that records are dependable and authentic. Usually, accuracy requires no more time and effort than inaccuracy in preparing records, and frequently much time and grief are saved thereafter by accurate original work.
5. *Available.*—The subordinates on the plant staff, as well as the management, should regularly inspect the operating records and should profit thereby.
6. *Economical.*—The cost of maintaining any operating recording system should be reasonable, and certainly the cost should and can be justified by the profits accruing from the use of such a system.
7. *Adequate.*—The system should include all important items in the operation of a plant. Usually, a complete operating recording system is inexpensive to install and to maintain. A complete system is just as inexpensive to maintain as an incomplete one.

To the extent possible, the system should use original records, or tie into and refer to records of original entry, so that they are always readily available at any future date. This is important for the protection of the operator of a purification plant. In this respect records have a very definite value which cannot be measured in terms of dollars and cents.

The plant operator and all his assistants who have any part in preparing or accumulating data each day for the operating records should by reason of so doing become more efficient and capable, for such work tends to acquaint those so engaged with each operation of the plant in a manner which otherwise would be impossible.

The operating records should be inspected and initialed each day by the management and then returned to the operators for their inspection of comments noted thereon, before they are posted and filed. It is human to be more alert and efficient when one knows that reports of his work will be scrutinized by another. Then, too, the manager or superintendent cannot reap the benefits of such a system unless he personally keeps in touch with the information being thus currently tabulated.

A carefully and expertly designed system of operating accounting is less burdensome to maintain than one designed otherwise, and such records should reduce considerably the cost and burdens of plant maintenance.

—From a paper by C. M. Roos, Vice-President-Manager, The Cairo Water Co., Cairo, Ill., presented before the Illinois Section, American Water Works Association.

Economic Disturbances Affect Water Usage

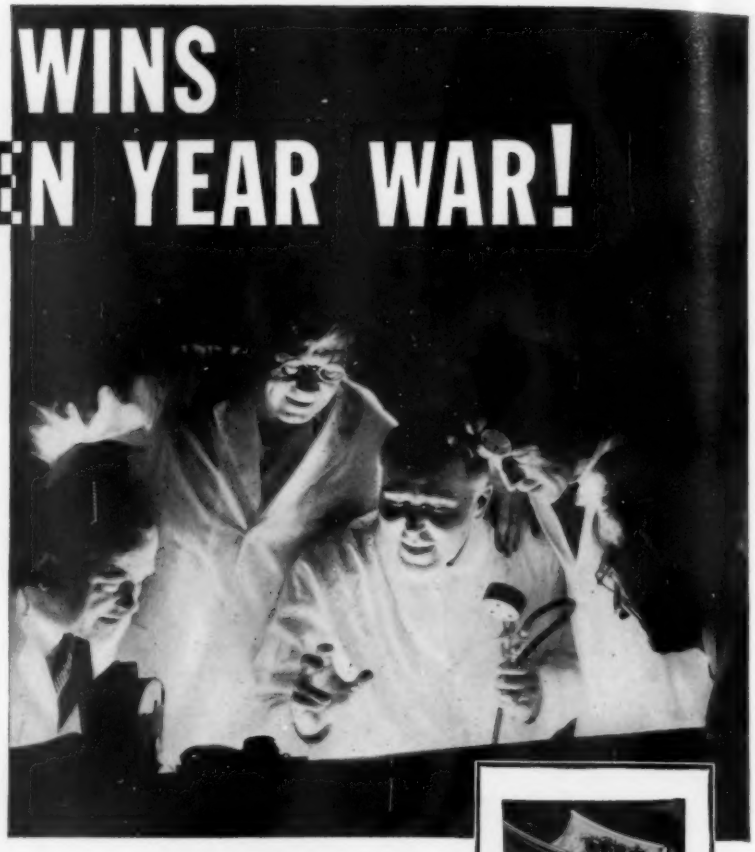
WATER consumption up to 1929 in the northern metropolitan district of New Jersey was increasing at a rate that foretold a shortage in 1938, becoming widespread in 1940. Then came the depression, and with it an unparalleled slump in the use of water for domestic as well as manufacturing purposes. There was a continuing drop until 1935, when consumption again stepped up. But another unforeseen event thereupon took place, namely, the discontinuance of the tin-weighting process in the silk industry. Although confined to the Paterson area, it had a leveling effect and offset the added consumption elsewhere in that district. At the end of 1936 the general trend was again upwards.

The recent annual report of the State Water Policy Commission of New Jersey states that several municipalities in New Jersey must have additional water not later than 1940. A large new supply ready for general use in the state must be ready some time between 1945 and 1950, depending on the rate of industrial and population growth in the busy counties of Bergen, Essex, Hudson, Union, Passaic, Somerset and Middlesex. There are today 25 public supplies and 10 private supplies in this district endeavoring at high operating costs to furnish water for 150 contiguous municipalities.

TO conserve water in their dry country, prehistoric Pueblo Indians of the Southwest would even bury a big pottery jar where it could catch water seeping through above.

—*The Pioneer.*

GOODYEAR WINS SEVEN YEAR WAR!



AMAZING NEW YKL TRUCK AND BUS TIRE CONQUERS INTERNAL HEAT . . .

Promises Great Economies on the "Murder Runs"

A war against heat!

A war against the deadliest enemy truck and bus tires have ever faced!

A war waged to curb the costly destruction of tires on the "murder runs"!

For seven years, Goodyear engineers have fought that war.

Today they stand victorious following one of the most spectacular achievements in the entire history of the rubber industry—the perfection of the New Goodyear YKL—built of Rayotwist cord.

Internal heat, in its attack on tires, has two powerful allies—tremendously large loads and the increasingly high speeds at which these loads are carried.

No conventional tires have been able to resist the internal heat created by heavy loads carried at sustained high speeds on the "murder runs". For years a super-tire has been sorely needed.

Goodyear engineers won their seven year war against heat only after they had found a new material for spinning yarn, evolved a new technique for twisting the yarn into tough, strong cords and perfected a new process with which to bind the cords to the rubber compound.

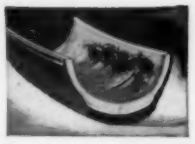
The material is Rayotwist. It is made from a special rayon with a tensile coefficient much higher than that of ordinary commercial rayon. Filaments of Rayotwist, very fine in texture, are spun into cord.

The process used to bind cord and rubber is a secret bath—now patented and owned by Goodyear.

When the Goodyear YKL was completed, southwestern deserts became the scene of the fiercest series of tests to which any tire was ever subjected.

There under a blazing sun, carrying back-breaking loads at terrific speeds, the new YKL tripled, quadrupled, even multiplied by five the mileage of conventional tires.

The seven-year war had been won. The world had its super-tire.



A section of the interior of an ordinary cord tire burned out and broken in fast, heavy-duty travel.

A section of a YKL Tire with the same number of miles at the same speed and under the same heavy load.

CAUTION!

Goodyear engineers now recommend the new YKL Tire only for the most destructive types of service—those "murder runs" over long distances at sustained high speeds.

In ordinary trucking, its extraordinary capacities cannot be fully utilized—and, frankly, its higher price cannot be justified.

But for operators of trucks and busses on "murder runs," Goodyear recommends the YKL Tire with full confidence in its ability to set new and spectacular performance records—to effect great savings as compared with the cost of conventional tires.

Such operators are invited to write direct to The Goodyear Tire and Rubber Company, Inc., Akron, Ohio, for full particulars.

GOODYEAR
TRUCK AND BUS TIRES

Trade Wastes — Sewage — Revenue Bonds

The Treatment of Industrial Trade Wastes

WHAT degree of purity should be required for the treated waste from a particular mill? Obviously, the answer to this can be determined only after a thorough study has been made of the extent to which the stream is already polluted, the standards of stream purity, and damage to boats, structures and fish life which will result from failure to properly treat the trade wastes. There have been many attempts to set definite standards of purity for effluents from industrial waste treatment plants, but, since the standards can apply only under certain conditions, it is questionable whether they should be mentioned. The difficulty of answering the question is pointed out in "Trade Waste Waters," written in 1913 by Dr. H. M. Wilson and Dr. H. T. Calvert, when they stated: "The Royal Commission on Sewage Disposal now sitting has for fifteen years been considering the question, but has not yet come to a final decision."

Not only is it impossible to reach a definite final decision, but no definite standards should be set for the purity of industrial effluents. One very important reason for this, which has not been emphasized sufficiently, is that the degree of purity to be obtained must necessarily be determined by that which is physically possible of attainment as well as by that which is economically desirable.

A few standards which have been suggested are listed below to show what degree of effluent purity has been thought to be reasonable in some cases. For sewage effluents, the Royal Commission suggested in the Eighth Report:

1. Not more than 30 parts per million suspended matter.
2. Not more than 20 parts per million 5-day B.O.D.

Their recommendation for industrial wastes high in organic content was essentially the same.

In their Ninth and last report, 1915, the Royal Commission suggested the following standards for treated textile waste effluents:

1. Wool scouring wastes:
   a. Suspended solids less than 40 ppm.
   b. 5-day B.O.D. less than 40 ppm.
2. Bleaching wastes: suspended solids less than 60 ppm.
3. Cotton dyeing wastes: suspended solids less than 40 ppm.
4. Cotton printing: suspended solids less than 60 ppm.
5. Woolen dyeing: suspended solids less than 40 ppm.

The Commission suggested that additional standards may be necessary for some wastes; e.g., standards of hardness, and of caustic alkalinity or acidity, or a requirement of neutrality, for effluents from various branches of cotton and wool trades. These should be considered as special standards which, under some conditions, may be more important than the general standard.

F. A. Barbour, consulting engineer, Boston, Mass., has suggested for wool scouring wastes:

1. Reducing total solids to 300 ppm.
2. A reduction of fats to 200 ppm.
3. Neutralization of acidity or alkalinity.
4. Removal of pronounced antiseptic properties.

Although this standard is much more lenient than that of the Royal Commission, the reduction of total solids to 300 ppm has been claimed to work undue hardship on the manufacturer. Other typical statements concerning the degree of purity of effluent required are:

"The character of the stream affects the degree of purification required. The requirements of the authorities in manufacturing areas will usually be met if the effluent is free from sediment, nearly neutral or slightly alkaline, contains nothing poisonous and is not heavily charged with organic matter." (W. M. Mackey and J. Miller: "The Cost of Treating Trade Effluents," J. Soc. Chem. Ind., 1909.)

"It is generally agreed that the requirements of a satisfactory effluent are that it should be neutral, having a pH value of 6 to 8.5; it should have a color value less than 100, the nearer white the better; it should be free from suspended matter; and it should have an oxygen content great enough to sustain plant and animal life." (From an anonymous article, "Trade Waste Disposal," in *Textile World, June*, 1935.)

The most reasonable standards that can be set are those which regulate stream purity. The degree of treatment required can then be fixed to maintain the stream standards.

—From "Textile Waste Treatment and Recovery," published by The Textile Foundation, Inc., Washington, D. C. Price, $1.00.

Stream Pollution Robs Natural Resources

PENNSYLVANIA, typical of the highly industrialized states, contains, roughly, 100,000 miles of streams. At least 80,000 miles of these streams are so grossly polluted by sewage and industrial wastes as to render them biologicai deserts, incapable of maintaining aquatic life of value to man. The ability of water to support aquatic life is a rather definite barometer of the value of such water for consumption by mankind and other terrestrial life. Pure water also affords that incidental, yet important, opportunity for wholesome outdoor recreation which has become a practical necessity to mankind. Fishing itself is a pretty big industry in this nation today, even under existing conditions. It is estimated that Americans spend not less than a billion dollars annually in pursuit of fish. In its present condition, it is the only industry in the United States in which the demand exceeds the supply, unless we except the kindred industry of hunting, and the game we seek is also somewhat dependent upon pure water for maintenance.

The liquid between the river banks in most of our highly industrialized sections is no longer water in its strict sense, but a conglomeration of more or less diluted human excreta and industrial poisons. We cannot afford to leave the destinies of our waters in the hands of the plunderers of natural resources who have found their personal gold supply enhanced at the expense of the people's rights. The Golden Rule is foreign language to those who continue to use public waters as their private sewers. There is no reason why those below should be obliged to manufacture water from the wastes of those above, except that it is cheaper for those above to have it so arranged.

Georgia Legislature Passes Revenue Bond Act

JUST before the close of its session a few months ago, the Georgia Legislature passed the Georgia Revenue Certificate Law of 1937. The Act has not yet been tested as to its constitutionality, but it is anticipated that a test case will go to the State Supreme Court within a very short time. The title of the Act reads: "An Act authorizing counties, cities and towns to acquire, construct, reconstruct, improve, better and extend revenue-producing undertakings; to maintain and operate the same; to prescribe, revise and collect rates, fees, tolls and charges for the services, facilities and commodities furnished thereby; and, in anticipation of the collection of the revenues thereof, to issue negotiable certificates payable solely from such revenues regulating the issuance of such certificates and providing for their payment and for the rights of the holders thereof, and for other purposes."

Section 2 of the Act, under the title "Definitions," specifically states that the law applies to causeways, tunnels, viaducts, bridges and other crossings, highways, parkways, airports, docks, piers, wharves, terminals and other facilities, water supply and the treatment and disposal of sewage, waste and storm water. Thus Georgia now enters that group of states with revenue bond acts permitting the charging of sewer rentals.

Our report on page 333 of the 1936 edition of The Municipal Index stated: "There is no general enabling act which permits Georgia cities to make sewer-rental charges. Several towns in Georgia collect sewer rentals under their own city charters. . . ." The new Act holds the door wide open to all Georgia municipalities to finance sewers and sewage-treatment plant construction from sewer rentals.

And So Grow OUR MIGHTY CITIES

Today a cross-roads settlement! Tomorrow, a line of skyscrapers. Such is the amazing story of our American cities. But a step in advance of all expansion first came the need for water—the life-blood of all municipal and industrial growth. Today, for cities and towns in every part of the nation, there are thousands of Layne Pumps and Well Water Systems daily producing millions of gallons of water.

Whatever your water need may be—whether in revising and modernizing an old, or putting in new pumps or the famous Layne Well Water Systems, Layne & Bowler, Inc., and their affiliated companies can always be depended upon for outstanding skill, the very finest equipment and a finished job that will give thoroughly dependable, long life service. No obligation for preliminary study and recommendation. For literature, write

LAYNE & BOWLER, INC.
Dept. B, Memphis, Tenn.

Listed below are the names and locations of some of our affiliated companies who understand the geological formation of your territory. They are completely equipped with all modern well drilling and pump installation facilities.

AFFILIATED COMPANIES

LAYNE-ARKANSAS CO. . STUTTGART, ARK.
LAYNE-ATLANTIC CO. . . . NORFOLK, VA.
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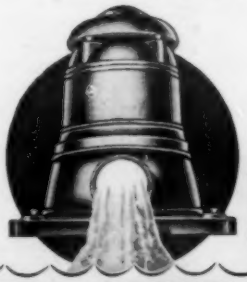
LAYNE-NORTHERN CO., MISHAWAKA, IND.
LAYNE-LOUISIANA CO., LAKE CHARLES, LA.
LAYNE-NEW YORK CO. . . NEW YORK CITY.
LAYNE-NORTHWEST CO., MILWAUKEE, WIS.
LAYNE-OHIO CO. . . . . COLUMBUS, OHIO
LAYNE-TEXAS CO. . . . . HOUSTON, TEXAS.
LAYNE-WESTERN CO. . KANSAS CITY, MO.
CHICAGO, ILL., AND MINNEAPOLIS, MINN.
LAYNE-BOWLER NEW ENGLAND COMPANY,
BOSTON . . . . . MASSACHUSETTS.
INTERNATIONAL WATER SUPPLY, LTD.,
FORT ERIE, N. . . . . ONTARIO, CANADA.



LAYNE PUMPS

WELL WATER SYSTEMS

Refuse Collection and Disposal

Refuse Collection in Toronto, Ontario

WASTE collection and disposal is one of the most essential public services. It is a service which affects every householder, and it is necessary that the personnel be courteous in the performance of this work. There must be coordination between the householder and the department responsible for collection. It is impossible to conduct a service requiring the separation of combustible and non-combustible waste if the householder is not willing to keep ashes out of containers which should be limited to combustible material.

In Toronto collections are made from the streets and from lanes. The point from which collections are made is determined by the Department of Street Cleaning, which is responsible for this service. The front or street collections are certainly not an adornment to any residential district, the ideal method being the carry-out system; that is, the receptacles are left in the side entrance or driveway, and when emptied are returned to this point. By this method the streets are kept reasonably clear of the usual unsightly array of assorted refuse receptacles. This system is not wholly practicable, with regard to the business areas and those streets upon which the residences have no side entrances.

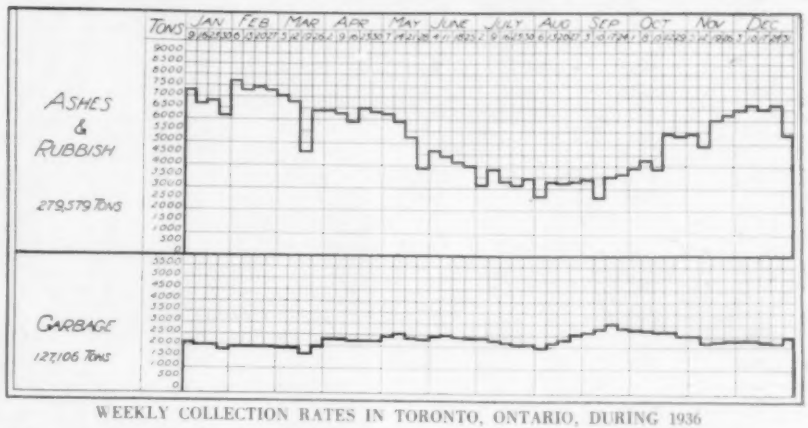
Lane, or alley, collections have a tendency to make the average householder careless in the manner of placing his refuse out for removal. In many instances the material is placed out loosely, and receptacles are often disturbed by peddlers and prowlers before they are emptied. The condition of some lanes, particularly in the foreign sections of Toronto, is anything but creditable to the district, owing to the placing of refuse loosely therein upon other than the regular days of collection, resulting in the scattering of the material. Inspectors are continually working in these areas in order that the nuisance may be reduced to a minimum.

SUMMARY OF REFUSE COLLECTION SERVICE, 1926-1936, TORONTO, ONTARIO

Year	Ashes and Rubbish (Tonnage)	Garbage (Tonnage)	Expenditure
1926.....	264,361	138,654	$842,237.00
1927.....	250,846	140,643	838,723.00
1928.....	259,758	152,326	854,823.00
1929.....	252,216	159,153	891,690.00
1930.....	254,189	162,560	900,838.00
1931.....	302,592	171,604	921,736.00
1932.....	278,738	167,775	894,154.00
1933.....	273,182	144,208	792,659.00
1934.....	281,573	136,291	747,588.00
1935.....	278,358	133,917	758,005.10
1936.....	279,579	127,106	761,219.27

—From the 1936 Annual Report of the Department of Street Cleaning, Toronto, Ont.

Refuse Collection Is a Public Works and a Health Service.



WEEKLY COLLECTION RATES IN TORONTO, ONTARIO, DURING 1936

The Spring Clean-Up

A CLEAN city is safe, healthful and attractive; a filthy city is unhealthful, subject to fires, and repellant to visitors and strangers.

Snow and ice have covered up filth and débris in streets, alleys, yards and around buildings. In basements or closets you may find old paint cans, paint rags, newspapers, wrapping paper, and other waste materials. In the attic you may have old, broken furniture, old hats, discarded decorations and other useless stuff. Boxes with excelsior, banana crates with hay, and other packing materials in the store basement, may endanger your valuable stock of merchandise. Homes, stores and shops will find plenty of rubbish to clean up, also accumulations of ashes.

City councils and village boards are authorized by law (in Wisconsin) to provide for the removal of all kinds of rubbish, placed along the streets and alleys. Notices should be published stating when city trucks will reach specified parts of the city or village. Mayors might well proclaim a Clean-Up Week. Firemen and health officers should see that the clean-up is a thorough one.

Women's clubs, commercial clubs and civic bodies should all aid in this important work. School children and Boy Scouts can be organized to clean up school grounds, parks, and lake and river banks. The united efforts of all will work wonders. When once cleaned up, keep it clean, at least until winter sets in.

Other things need attention also. There may be straw or leaves banking around your buildings, the shingle roof may be punky and moss-grown, just waiting for a chimney spark. Replace such shingles with fire-retardant roof covering.

Spring also is the painting season. Destroy paint rags and waste before such ignite spontaneously.

The rubbish fires must be watched, also children playing around such fires. Extinguish these fires in the evening. Never build them near buildings or on windy days.

Much has been accomplished in past years in such clean-up movements in Wisconsin. If you have not started such a movement, plan now for clean homes and yards, stores and shops, cities and villages.

—From an appeal issued by the Industrial Commission of Wisconsin, April 2, 1937.

THIS RD 8 TRACTOR WITH AN ANGLEDOZER WAS KEPT BUSY LEVELING A CITY DUMP AT LOUISVILLE, KY., FOR TRUCKS HAULING MUD AND REFUSE BEING REMOVED WHEN THE FLOOD WATERS RECEDED

First Valves and Hydrants for
NEW YORK WORLD'S FAIR, 1939

Furnished by

A. P. SMITH MFG. COMPANY

East Orange, New Jersey

Manufacturers of

Tapping Machines, Tapping Sleeves, Tapping Valves.
Valve Inserting Machines, Inserting Sleeves, Inserting Valves.
Water Meters, Curb Cocks, Corporation Cocks, Removable Plugs, Repair Sleeves.
Corporation Tapping Machines.
Valves and Water Gates; Hydrants; Pipe Cutting Machines.
Special Machines for inserting 24 in. and 30 in. valves in horizontal position.
Water Works Specialties and Supplies in general.

Branch Offices:
7 S. Dearborn St., Chicago; 901 William Oliver Bldg., Atlanta, Ga.; 1013 Southwestern Life Bldg., Dallas, Texas; 2799 Piedmont Ave., Berkeley, Calif.; 315 No. Crescent St., Flandreau, S. Dak.

Health and Sanitation

The Importance of Health

HEALTH is best for mortal man; next beauty; thirdly, well-gotten wealth; fourthly, the pleasure of youth among friends.

SIMONIDES.

A Monthly Health Bulletin

DO you see the Monthly Health Bulletin published by the Library and Publicity Division, Department of Health, Memphis, Tenn.? With a yellow cover and mimeographed text pages, it offers an economical method of distributing valuable information throughout the city.

The January, 1937, issue was devoted to a series of articles on malaria as well as the regular Department Reports and the Department Directory. The articles are: "Malaria Control in Memphis," "Malaria Control Around Memphis," "Malaria Control Ditching," consisting of two pages of illustrations with the title "Smoothing Memphis Ditches Makes Rough Going for the Mosquitoes," and an article, "Scratching the Surface of Progress," which tells of the work done by Memphis and its Department of Health in setting up a flood refugee camp at the Mid-South Fairgrounds on the outskirts of Memphis.

This Bulletin tells the Department of Health's story vividly and is excellent sales talk for more funds to preserve the health of the community. Health officers and other municipal officials interested in securing a copy should write to the Department of Health, Memphis, Tenn., for the Bulletin.

$8,000,000 *in Grants for Health Work*

IT is important that every city re-canvass its public health needs, because under Title VI of the Social Security Act an appropriation of $8,000,000 will again be available for grants-in-aid for state and city health activities in the fiscal year beginning July 1, 1937. To be eligible for a share in the appropriation, which is allocated on the basis of population, special health problems, and financial needs, each state must present a plan annually for sanction by the United States Public Health Service, and the United States Surgeon General must approve the state budget. For the major portion of these funds it is required that half the allotments be matched by existing funds and half by new appropriations for health work made since January, 1, 1935. In 1936, all 48 states, as well as the District of Columbia, Alaska and Hawaii, received grants. Amounts ranged, in the states, from $29,312.98 in Nevada to $705,566.86 in New York.

In order that cities and states may benefit from this program, cities should confer with their state directors of public health concerning present state plans for services to cities by the state department.

Grants to states for public health work have been budgeted for four major purposes:

1. To strengthen the administrative divisions of the state health department, including the establishment and development of state health laboratories, divisions of vital statistics, public health nursing, etc.

2. To undertake activities to solve special health problems—communicable diseases, venereal disease control, industrial hygiene, tuberculosis, cancer control, etc.

3. To assist local health services, including the development and maintenance of adequate full-time city, county or district health services.

4. To assist in the training of state and local public health personnel.

As an example of additional services made possible by the expanded public health program, New York State has provided full-time, trained district health officers, nurses and other personnel throughout its counties, where only a skeleton organization had existed before. A state-wide pneumonia campaign has been set up. Pennsylvania has added considerably to its facilities for tuberculosis control and has organized a new Division of Industrial Hygiene in collaboration with the State Department of Labor. Indiana has established a division for the promotion and supervision of local health services, has added facilities for venereal disease control, and has contributed $71,000 annually to local health services.

Soot Stopped in Stacks

DENSE clouds of fumes threatening the greenery and freshness of a countryside, and fragments of unburned coal and ash belched from factory chimneys, bent on soiling linen on the line, dirtying fresh paint and causing ill health, may now be checked at the shriek of a whistle. Precious particles of gold, silver, lead, copper and zinc bound skyward from a smelter stack can now be knocked out of the fume and collected as valuable by-products. All this is done by a "super-sonic wave."

The new device, invented by H. W. St. Clair, metallurgist of the U. S. Bureau of Mines, was demonstrated recently. The device should be of real aid in solving the smelter-fume problem, which has for years been a source of expensive litigation due to suits brought by property owners charging damage to vegetation, live stock and water supplies. The device should also be of value in helping to curb the smoke nuisance in large cities, which has been responsible for injury to property and health running into many millions of dollars annually.

It has long been known that when sound waves are passed through a tube containing a fine powder, the powder will be concentrated at points that are free from vibratory motion. It has also been known that waves of extremely high frequency affected the diffusion of solid or liquid particles in a gas. Prior to this time, however, no practical application has been made of this knowledge. The St. Clair method merely passes the smoke or fume through a tube in which standing sound waves are established. These waves are produced by so adjusting the length of the tube that waves reflected from the upper end are in phase with the critical sound waves set up at the lower end. In order that the process may work at its best, the wave-length used must be approximately equal to the diameter of the tube. For a tube of practicable diameter, this means that the frequencies used will vary from 3 to 20 kilocycles per second. A person of acute hearing can detect waves of frequencies up to about 5 kilocycles; those of greater frequency are above the auditory range and hence are sometimes called "super-sonic."

The installation of the process which has now been devised should be comparatively inexpensive, since it utilizes simple sound waves instead of the more elaborate processes employed in other fume-treatment methods, and is therefore adaptable to the smaller plants.

New Outlook on Hookworm

AN article in *The Military Surgeon* by Major Clyde C. Johnston places part of the responsibility for hookworm on water supplies. The disease, which public health officials estimate normally affects 4,000,000 in the United States, heretofore has been believed to be transmitted only by walking barefooted over infested ground.

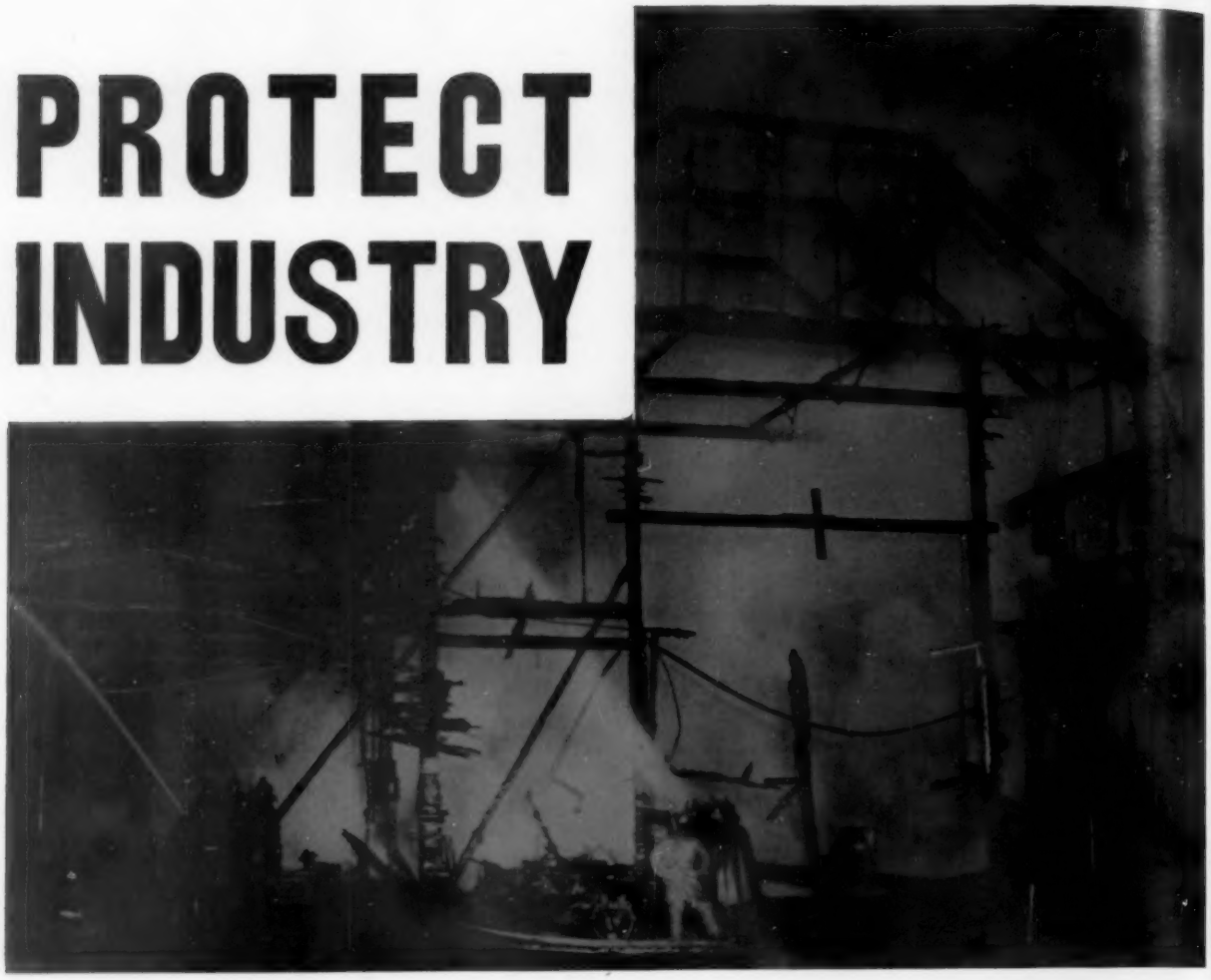
Major Johnston declares that the anemia normally associated with hookworm is not caused by the infective worm but by lack of proper food. It is stated that the new facts were uncovered by Major Johnston when he discovered a soldier in the Sixty-fifth Infantry in Puerto Rico who had hookworm and later found about 11 per cent of the enlisted men in one battalion surveyed were similarly infected. Although these cases were freed of the worms, a survey of the same group a year later showed an almost identical percentage infested.

These soldiers did not acquire hookworm in the usual way, by walking barefoot, according to Major Johnston, because they all had worn shoes since childhood. He claims that it was eventually determined that they normally drank water from a hookworm-polluted source.

Life without health is a burden; with health is a joy and gladness

LONGFELLOW.

PROTECT INDUSTRY



PROPERTY CREATED BY YEARS OF INDUSTRY IS DESTROYED BY FIRE IN AN HOUR

as the result of only a slight delay in sending an alarm.

Fire is the greatest destroyer of property, and—*delay* due to inadequate facilities for transmitting alarms to the fire department is the greatest accelerator of the flames.

A reliable Fire Alarm Telegraph System with adequate box distribution protects property, gives the fire department a chance to keep losses small, and relieves the community as a whole from the responsibility for fire waste due to *Delayed Alarms.*

Surveys, plans, and estimates furnished without cost or obligation.

The Threefold Fire Alarm Box

"A Box a Block" in congested high value districts; not more than 500 feet to the nearest box in closely built residential districts; convenient to every group of buildings, manufacturing establishments, and institutions in sparsely built districts, is generally a safe rule to follow.

THE GAMEWELL COMPANY

NEWTON UPPER FALLS MASSACHUSETTS

When you write for that catalog, kindly mention THE AMERICAN CITY.

Public Safety

Fort Worth Likes Parking Meters

So far as I am able to determine, the citizens of Fort Worth are generally satisfied with the parking meters which we have installed, and I think that the same is true of the merchants. While parking meters are not a panacea for the traffic problem, they do definitely restrict the amount of double parking and of excess driving around the block. Of course, there are some periods of the day and week when the number of cars seeking curb parking space far exceeds the capacity. There is, on the other hand, the fact that charge for curb parking space induces many to use parking lots when they expect to be downtown for a period of greater than one hour. There is certainly more parking space available under normal conditions, and at the same time we have not driven cars from the streets.

In general, I should say that parking meters are quite satisfactory as a traffic device.

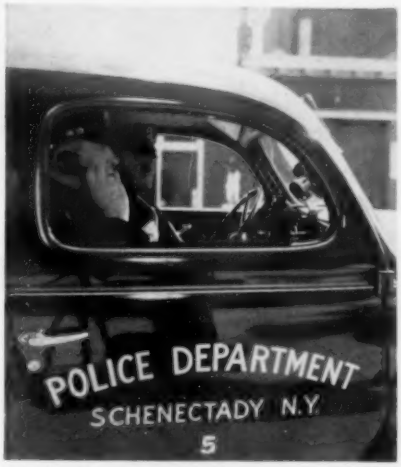
LEO W. HOELSCHER,
City Manager.

Bus Builder Writes Successful Safety Lessons

An interesting case of a bus builder following through to see that his vehicles are used safely is furnished by the Rex-Watson Corporation, Canastota, N. Y., which delved into its own engineering research and compiled a series of fifteen three-minute safety lessons, master copies of which are offered free to any school in the United States or Canada.

A card from the teacher informs the parents of what is being taught to their children and requests them to discuss the course daily at home. The aim of this industrially-sponsored course is to stress the "do" things and not the "don'ts."

The original mimeograph printing of 2,000 sets, with an offer to supply as many complete sets as a school might need, was quickly exhausted. Hence the present limitation to copies for duplication by the school.



Of the 367 municipal and county police-radio stations now in operation, 317 are two-way. Bayonne, N. J., in 1934 was the first to install two-way; Boston is the first large city to install it extensively; Nassau County, N. Y., is the most recent extensive installation

Wilkes-Barre Is Pleased with Parking Meters

The city of Wilkes-Barre was laid out about 1770, and the original plan did not call for enough streets or wide enough streets. As it is the center of a population of about 300,000 people, the congestion of our streets retarded traffic to a very great extent. The parking meter has assisted the speeding-up of traffic and has accommodated those who wish to do business in the city. We have 200 Mark-Time meters in operation at present.. The attitude of the merchants has been from the start very favorable, with very few exceptions. Motorists who were anxious to do business in the city have been delighted. The general public is pleased and we are encouraged to believe that an extension of the meter system should be made.

CHARLES N. LOVELAND,
Mayor.

Insurance of Municipal Motor Vehicles

An inquiry among members of the Maine Municipal Association as to practices in the carrying of various types of insurance on fire department apparatus, shows that most of these municipalities do not carry such insurance because the state law does not make a municipality liable for damages that may result from operating a truck or car in carrying on a governmental function; nor is a municipality liable for acts of its agents. "Nevertheless," says the Association's *News Letter*, "some municipalities do carry property damage and personal liability insurance on their fire department vehicles, some perhaps because of ignorance as to the rule of law as above stated and others simply because the officials feel that the city has a moral obligation to make recompense for injuries inflicted through the negligence of its employees, even though there is no legal obligation on the part of the city. And while the question of whether such insurance should be carried is a matter of policy for local determination, there is, however, one point in this connection upon which there is no disagreement, namely, that if a municipality does carry liability insurance on its fire department equipment, in all cases there should be inserted in the policies a clause to the effect that the insurance company will not take advantage of the non-liability of the city to escape payment of claims."

Traffic Awards at Harvard

In its attack upon the automobile accident and congestion problems, the Bureau for Street Traffic Research at Harard University has launched a second series of fifteen graduate fellowships to make possible a year's intensive training and research in the methods and practices of traffic control. (See p. 133.)

AT RIGHT—

MUNICIPAL MOTOR-VEHICLE INSPECTION
Knoxville's Safety Lane in a $10,000 building on a $10,000 lot with Bendix motor-vehicle safety inspection equipment, which tests 500 autos per day until the city's 25,000 vehicles have been passed as safe for the streets

PERMANENCE

McWANE 2" CAST IRON PIPE

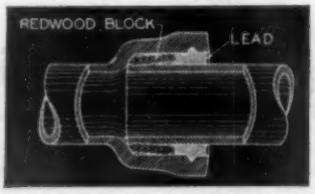
CORROSION RESISTING • NO REPLACEMENTS
PROTECTS PAVEMENTS • INCREASES REVENUES • LOWEST COST PER YEAR

STANDARD *from* COAST *to* COAST

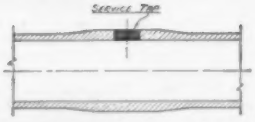
THIS IS THE PIPE

that resists corrosion, stops water losses, ends replacements, lasts for centuries . . . a tremendous dividend for the few extra pennies per foot involved in first cost.

THIS IS THE JOINT



used in McWane 2" *cast iron* pipe from coast to coast. The Pre-calked materials are in the bell. Just socket and calk!



TAPPING COLLAR

Yes, McWane 2" has tapping collars, saving you cost of the clamps. Wet taps easily made with standard tapping machines.

FITTINGS

equipped with joints suitable for water, gas, air and other services.

Sand Cast Inside and Outside

McWANE
CAST IRON PIPE COMPANY
BIRMINGHAM, ALA. SIZES 1¼" THROUGH 12"
Chicago, Dallas, Denver, Kansas City, New York, Portland, Ore. Salt Lake City, San Francisco, Los Angeles

over 25,000,000 FEET IN USE

19 37

US

TS MAKE NT METERS TERIORATION ENCE...CAPITAL PAIRED...

THE **5** MILLIONTH

SPLIT CASE TYPE HAS INTERCHANGEABLE PARTS

Q. E. D.

Lack of Meter Depreciation Astounds Water Rate Probers

Depreciation, bugaboo of industries, is not part of a water meter expert's worries.

There is no such thing, says Henry Horandt, New York meter expert and graduate of Rensselaer Polytechnic Institute who was summoned by Rochester and Lake Ontario Water Service Corporation to appear before the Public Service Commission Saturday.

The commission, investigating the rates charged by the company, was mystified by the company's statement that water meters did not depreciate.

Almost unheard of they said.

So up from New York came Horandt who backed [illegible] statement. He took a meter apart under the eyes of [illegible] showed its workings. [illegible] manufactured in 1898, he declared, repaired with parts manufactured today.

Not only is there no depreciation, but there is scarcely any change in design. So he took an old meter filled in new parts, and it worked perfectly.

Under PSC regulations the company must test its meters every five years. The company more than complies with these rules, officials said.

From Rochester "Democrat and Chronicle"

THEY ARE TRIDENT WATER METERS

THOMSON METER CORP.

[illegible] CENTER) NEW YORK CITY

[illegible]ATER METERS MADE AND SOLD [illegible]Y INTERCHANGEABLE PARTS . . . . . .

Elimnation of Useless Waste by Metering

A. T. COOK

Gen. Supt. and Chief Engr., Passaic Valley Water Commission

Paterson, N. J.

THE question often arises among waterworks engineers as to what percentage of waste is eliminated by the installation of water meters. Probably no one can answer this question accurately, but a good idea of what metering will do towards eliminating waste can be obtained by examination of the records of the older water systems before and after meters were installed.

The city of Paterson, New Jersey, offers one of the best examples of the effect of metering.

The water system was started in 1856 and until 1895 was run in what might be called a home made fashion. No records of pumpage were kept and consumption was only a matter of guess work. In 1898 the late J. Waldo Smith was employed as General Superintendent and Engineer of the company, and he immediately started the installation of meters. At that time the consumption of Paterson was eighteen and one-half million gallons per day with a population of approximately 126,000, or 147 gallons per capita. Complete installation of meters was accomplished in 1909, at which time, with a population of approximately 135,000, the consumption had dropped to eight and one-half million gallons daily, or 63 gallons per capita.

The consumption continued at approximately the same average until 1919, when the increase in the tin-weighting process for silk dyeing caused a rapid increase in water consumption. These figures show that there had been prior to 1898 some 54 per cent waste. During the twenty-one years between 1898 and 1919 the saving in pumpage was 60,000 million gallons which at a cost of $12.00 per million gallons, represented a saving of $720,000. Against this saving must be charged the $300,000 meter installation expense, leaving a net saving due to meter installation of $420,000.

The above is not the only saving which can be credited to the installation of meters. From 1919 to 1928 the consumption of Paterson increased to 32 million gallons daily, while for the whole system the consumption for that year was 72 million gallons daily. This consumption represented the greatest amount that the system was capable of producing, so it can be safely said that but for the elimination of useless waste by metering the company would have been forced to increase both its water supply and its transmission mains at an estimated cost of $7,000,000.

It must not be taken for granted that with the installation of meters all troubles come to an end. Meters must be properly maintained. Many a water company has become careless in its meter maintenance, and as the efficiency of its meters decreased, has looked to the Public Utility Commission to increase its rates. The result has been that the people rebelled, asked for public ownership and the company lost its property.

A properly maintained meter department is the most important part of any water system whether private or municipal. It is possible to sell 90 per cent of the water delivered to the system through meters, and every waterworks operator should make that figure his goal. If he can maintain his sale of water between 85 per cent and 90 per cent of the total output, he need not worry about either deficits or increases in rate.

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Published in the interest of economy through universal water metering . . . by the Neptune Meter Company, 50 West 50th St., New York City.

JUNE, 1937

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The American City

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New York

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Better Pressure — Better Service — in Buffalo Water Works

Program of Construction of Elevated Tanks and Interconnection of High and Low Services Beneficial to Operation

By WILLIAM H. GROTZ
Assistant Engineer, Division of Water, Buffalo, N. Y.

THE construction of one of the largest elevated water-storage projects in the country, consisting of three 2,000,000-gallon tanks, has recently been completed and placed in service in the Buffalo, N. Y., water-works system. The installation of these tanks, which are located at different points in the distribution system, together with the subsequent inclusion of the entire system in one principal pressure service, has resulted in a striking improvement in the strength and flexibility of the system. A general increase in pressure throughout the city has been accomplished with an actual reduction of pressure at the pumps.

The Present Water Works

The Buffalo water works has been owned and operated by the city since 1868, when it was acquired by purchase from the Buffalo City Waterworks Co. The original works included a pumping station, a 7,000,000-gallon reservoir, and about 33 miles of water mains from 3 to 20 inches in diameter. These have since been largely replaced, and the system materially improved and extended, until at the present time it includes two pumping stations having a combined capacity of 270 million gallons daily; a modern rapid sand filtration plant having a capacity of 160 million gallons daily, and a distribution system comprising 768 miles of water mains, of which 139 miles are feeder or trunk mains ranging from 16 to 60 inches in diameter, and 624 miles of distribution mains 4 to 12 inches in diameter.

The water supply is taken from Lake Erie, an inexhaustible source, passes through the filter plant, and is pumped to the distribution system through three 60-inch discharge mains from the Ward station, and three 48-inch and one 36-inch discharge main from the Massachusetts Avenue pumping station.

The system serves over 100,000 consumers, of which approximately 19,000 are industrial. The consumption ranges from 89 million gallons daily to 149 million gallons daily, averaging 116 million gallons daily.

The Distribution System

Buffalo is situated at the eastern end of Lake Erie, covers an area of about 42 square miles, and has a population of approximately 600,000. It is an important transportation and manufacturing center, and its growth has been consistent and substantial. The terrain is gently rolling, ranging from Elevation 575 above sea-level to Elevation 695 in the extreme northeast portion. Development extends generally to the city's boundaries, and only a small part of the city has not been built upon.

The distribution system was operated for many years as two independent pressure units classed as high and low; the high service being on direct pumping, while the low service was on the reservoir. In 1871, development of the city on higher ground to the north made it necessary to pump at increased pressure to provide adequate service for this region. To accomplish this, the water mains supplying this district were isolated from the system, which, at the time, was on the reservoir, and the district was served by direct pumping. This was the inception of the high service. This service continued on direct pumping, while the low service remained on the reservoir.

When originally built in 1894, to replace a prior reservoir, the Best Street reservoir was to the north of the city, and the elevation at that point was thought sufficient to provide ample pressure by gravity for about three-quarters of the city while the remaining area could be supplied at a higher pressure by direct pumping. There was little anticipation that the city's growth would reach the still higher land to the north and east. As the city's growth extended in these directions, the high service was extended until eventually the north and east corporation limits were reached. The service also underwent further expansion from time to time to the south, into territory supplied by

THE NORTH OR BLACK ROCK 2,000,000-GALLON TANK, 154 FEET HIGH

the low or reservoir service, owing to insistent demands for greater pressure and increased fire protection by business and industrial interests. The high service has been extended and the low service curtailed until in recent years less than one-third of the city was supplied from the reservoir and over two-thirds by direct pumping on the high service.

The Best Street reservoir, which was abandoned in 1936, acted as an equalizer and distributor on the low-service distribution system. It had a capacity of 116 million gallons when full at Elevation 685, and was divided into two interconnected bays, and each bay was connected to the low-service distribution system by 36-inch mains.

Until the recent improvements to the distribution system had been made, the only storage capacity on the high-service system was the 40-foot diameter standpipe, 85 feet high, known as Kensington Tower. The effective capacity of this standpipe was too small to materially affect the system. It was used as a balancing reservoir or cushion to govern the pumping rate. When the water level in the standpipe dropped below a certain point, the pumps were speeded up until it reached the high level, when they would be slowed down. This was accomplished by having watchmen who were posted at the standpipe telephone the pumping station at intervals of 30 minutes or less if necessary.

Improvements Necessary

The operation of the distribution system with high and low services presented many objectionable conditions, but until adequate elevated storage was provided on the high service, little could be done toward eliminating these. While the system included a strong radial and belted arterial main system with pipes of ample capacity, these could not function to fullest advantage. Innumerable poorly fed dead-ends existed in the distributing mains along the service division line owing to closed gate-valves. High- and low-service mains crossed one another at frequent intervals. Pressure was inadequate in many sections of the city, and pressure regulation on both services was poor, being markedly so on the low.

For many years fire insurance underwriters had been urging the city to make improvements which would increase the pressure in the distribution system, particularly in the south district where the elevation of the Best Street reservoir no longer provided adequate pressure for fire service. The National Board of Fire Underwriters had recommended that the low service be included in the high service, and since maximum differences in elevation in the city are only 120 feet, this was deemed desirable. These improvements automatically eliminated the reservoir from active service owing to its low elevation.

Elevated Storage Program

Proceeding on these recommendations, the present administration obtained approval of a program embracing the installation of 6 million gallons of elevated storage, the abandonment of the old reservoir, and the establishment of one principal pressure service on direct pumpage. This program provided for the pressures and fire-flow reserves desired by the underwriters, and at the same time eliminated the cost of expensive repairs to the reservoir which had become necessary.

Immediately upon approval of the project, plans and specifications for the improvements were prepared by the Water Division under the direction of Alan D. Drake. Careful study had determined that the maximum benefits would best be obtained by installing three 2-million-gallon elevated steel tanks at separate locations in the northwest, east central, and southeast districts of the city; and the inter-connection of the high and low service.

The first tank was erected in the east-central district on land adjoining the City Hospital Annex in East Ferry Street; the second tank in the southeast district, on Hancock Street between McKinley Parkway and Downing Street; and the third tank in the northwest district at Rees Street and the Scajaquada Parkway.

Before the recent extension of the high service to the entire city, it had been operated with the water level in

THE 2,000,000-GALLON EAST TANK, 109 FEET HIGH

Kensington standpipe at about 70 feet above the bottom, which is equivalent to 750 feet above sea-level. In determining the height of the East Tank, it was decided to raise the pressure slightly throughout the system, and the high-water line of this tank was established at 752 feet.

The East Tank was erected first to accelerate the abandonment of the Best Street reservoir, so that the site could be developed as a recreational center, and a stadium built under WPA auspices. The East Tank was located on the high service about a mile from Kensington standpipe, as it was believed, and later verified, that the water plane at both would be practically the same. The land was city-owned and available for immediate construction of the tank.

Pitometer Survey Speeded Work

It had been planned to erect the East Tank first, and after converting the distribution system into one service, to install pressure-recording gages at the other two tank locations to determine any differences in the water planes from those of the Kensington Tower, and so obtain the elevations of the high water lines for the North and South Tanks. However, as it was inexpedient to convert the entire system at one time, and the speedy erection of the tanks was urgent, a pitometer survey was made to determine these elevations in advance of the conversion of the system, the purpose being to insure that all three tanks would ride on the system and, under average day consumption rates, be maintained close to seven-eighths full.

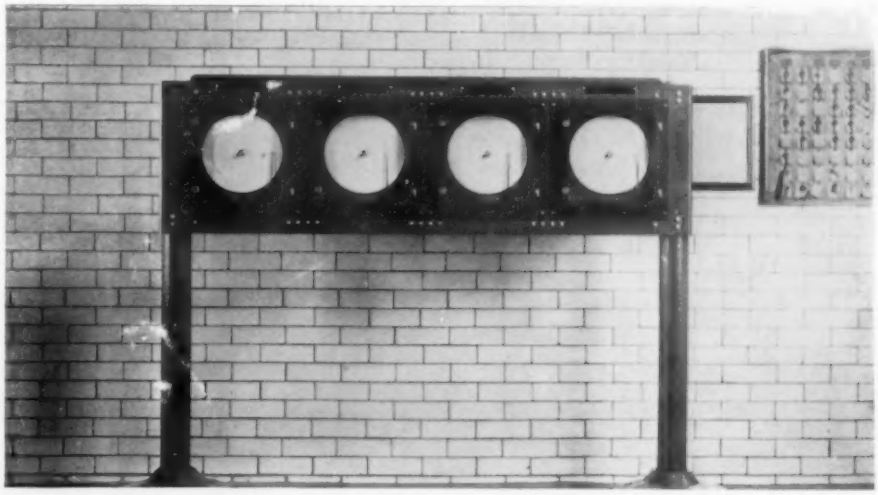
This ideal condition could not be expected at all times, however, owing to the distances between the tanks and the varying consumption rates from day to day and month to month; consequently each tank was equipped with an automatic cone-type altitude valve to prevent overflowing. These valves are placed in the pipe lines leading to the tanks and are set in vaults beneath the structures.

While the pitometer survey was arranged for primarily to insure the correct elevation for the North and South Tanks, it was extended so as to obtain all the data possible concerning the rates of flow, friction losses, pipe coefficients, etc., in that part of the arterial main system most affected by the conversion of services. This was done to determine any deficiencies in the mains, or the need of new extensions or replacements. As a result of this survey, it was found that a very well balanced condition existed between the East Tank and the Kensington standpipe.

The height of the flow line of the North Tank was determined to be at Elevation 756. In computing the elevation of this tank, two sets of conditions were necessary because of restrictions in two of the trunk mains supplying this district, one being a 36-inch pipe, the other a 24-inch pipe. The elevation adopted represents the computation with these two mains in full service.

The elevation of the water level at the South Tank was computed at 749 feet. The distribution system was found to be well fortified with ample feed mains, few of which carried high velocities. In general, the coefficients were found to be higher than normal for the age of the mains.

New 24-inch water mains were laid to connect the tanks with the 36-inch arteries in the distribution system. The work and material for these mains was supplied by the WPA. Four 24-inch by-pass connections were also installed by the WPA at several points where arterial mains of the former high- and low-service systems crossed but were not connected. This work was done under the supervision of the Division of Water.



THE TELEMETER RECORDERS IN THE CHIEF ENGINEER'S OFFICE IN THE COLONEL WARD PUMPING STATION

From left to right, they indicate the elevation of water in the Kensington standpipe, the Central or East Tank, the North or Black Rock Tank, and the South or Hancock Tank

The New Elevated Tanks

The tanks are of harmonious design, being cylindrical in cross-section and having a dome-shaped roof and a radial-cone type bottom. The supporting columns are substantial and are arranged in two concentric circles with 16 volumns in each. The riser is 10 feet in diameter. The whole, painted with two coats of aluminum over red lead, presents a pleasing appearance.

The foundations for all the tanks were built by the WPA forces under supervision of the city. The foundations for the tank structures differ, owing to local conditions. The foundation for the East Tank consists of reinforced concrete piers set on rock at a depth of about 15 feet, while that for the South Tank is the usual standard type for these structures with spread footings of reinforced concrete. Steel H-piling was driven to rock a distance of 84 feet to support the North Tank structure.

These tanks and tank structures were paid for by the Division of Water, while the cost of material and labor for the foundations was borne by the WPA.

Pressure Control

To provide the operators at the pumping station with complete information regarding the pressure conditions in the system at all times, Telemeters have been installed on all three tanks and the Kensington standpipe. These Telemeters operate four indicators adjacent to the operator's desk in the pump room and four Telemeter recording gages in the office of the Chief Engineer at the Ward pumping station, and afford a continuous check on the entire system.

Soon after the South Tank was erected and placed in service, the cross-connections between the high and low service, and all boundary valves separating these systems, were opened, and the distribution system began to operate on direct pumpage as a unit. The conversion of the system was made on May 25, 1936. During the next few days a few sporadic breaks occurred in pipes in the low-service area, and these were due principally to deterioration of some of the more ancient mains.

Special High Service

The Cleveland Park District, located at the northeast city limits, is considerably higher than the surrounding territory. This district is supplied by an auxiliary high service through a booster plant. The plant includes two 1,200-gpm electrically driven centrifugal pumps and a 250,000-gallon elevated tank. The supply for this service is drawn from trunk mains in the main distribution system. The plant operates automatically, and the pumps deliver against a head of 115 feet. The tank is supported by a reinforced concrete cylinder, and an architectural concrete tower encloses both the tank and the pumping installation.

Buffalo also has an independent high-pressure fire system, operated by the Fire Department, which provides additional fire protection to the congested value district of the city, embracing about 75 per cent of this area. This system, supplying hydrants only, has a capacity of 18,000 gpm at a maximum pressure of 300 pounds.

Benefits of Improvements

Immediate results of the program of improvements to the Buffalo water-works system were manifold. A general increase in pressure has been obtained throughout the system, with a maximum pressure in the former low service, where it was most needed. The average pressure in the congested value district is over 60 pounds, fulfilling the desire of the fire underwriters. The general pressure increase was obtained while the pressure at the pumps was reduced about 10 pounds.

The interconnection of large trunk mains and the opening of all boundary valves between the former services has resulted in a vast increase in the flexibility of the pipe system, insuring a better balance of flow rates.

Storage is now available on the whole system, and, for the first time, in the former high-service area.

The new elevated storage affords ample relief and control with the entire water-works system on direct pumpage. The pumping rate has been more uniform, showing a very slight variation. Before these improvements were made, the pressure variation on the former low service was as much as 30 pounds, extending from a minimum of 25 pounds to a maximum of 55 pounds.

It is still too early to determine direct results of these improvements, as applied to pumping efficiency and economy of operation. The greater efficiency of the Buffalo water-works system since the installation of elevated storage, and the conversion into one pressure system, insures adequate service and fire protection over the entire city and undoubtedly will result in greater economy of operation.

Personnel

The program of improvements to the Buffalo water-works system was under the supervision of the city as represented by the following: George J. Zimmerman, Mayor; George J. Summers, Commissioner of Public Works; Division of Water, Alan D. Drake, Director, James A. Garey, Deputy Director; William J. Kelly, Superintendent of Distribution, and the writer.

Old Halls Tell Tales

A NOVEL way to relate the history of a town is to trace the march of events through an ancient municipal building. In Exeter, England, there still stands a building whose origin is lost in the dimness of another age. The earliest reference that can be found to the Exeter Guildhall is in a deed of about 1160, and subsequent deeds identify, beyond reasonable doubt, the existing building with the Guildhall of that year. Only portions of the main wall, however, have survived from the original Norman or Saxon structure, the remainder as it stands today being composed of a curious mixture of alterations of different style. The main hall, for example, is medieval; the forefront, Elizabethan. But every feature of the building is a living chapter in the history of Exeter, and as such has been written up in "The History of the Exeter Guildhall and the Life Within"* by H. Lloyd Parry.

For eight centuries or more the Guildhall has been the heart of the civic life of Exeter. In olden times it not only housed the directors of public affairs, but contained the benches whereon legal agreements between citizens were witnessed and signed, the grim court of justice, the prison house, the armory, fire equipment, and a chapel. Often, too, its rooms were the scene of civic feasts and revels. An ancient bell, still suspended in the roof, used to summon the meetings and ring on occasions of rejoicing. Only the rapid expansion of municipal activities within the last half-century has necessitated a more specialized use of the Guildhall. Municipal offices, courts and police station have been established in new buildings, while the "Ancient Monument" (so scheduled by the Office of Works of the United Kingdom) is reserved for the more important functions, the meetings of the City Council, the Assize Court and the Court of Quarter Sessions, mayoral social functions and such conferences and public meetings as the Mayor may sanction.

* This 174-page history can be obtained from the Exeter City Council, Exeter, England, for 6 shillings.

The Stub Plan of Customers' Accounting as Used by the Cincinnati Water Works

By M. F. HOFFMAN
Commercial Superintendent, Department of Water Works, Cincinnati, Ohio

MANY have been the discussions of the advantages of the stub plan of customers' billing and accounting for public utilities over the ledger and ledger card methods. This article makes no attempt to establish a claim of superiority, for it is intended here to show only the procedure necessary for the operation of the stub plan, leaving the adoption of this method to the consideration of water-works administrative officials.

It is an established fact, however, that the expediency of operation and economies effected offer a challenge to water-works managements. The plan provides: (1) an ideal means for cycle or staggered billing by a minimum personnel without peak-load periods; (2) a means of billing and accounting entirely by machines; (3) a daily balance of accounts receivable, thus eliminating a check-up at the close of the accounting period; (4) a flexible method of handling partial- and over-payments; and (5) a mandatory enforcement of collecting delinquent accounts.

The stub plan is no longer a novelty. It has been in use by the American Telephone and Telegraph Co. since 1914 (the writer assisted in this installation) and was subsequently adopted by the largest utilities in the United States. The perfection of billing and accounting machines has enabled the preparation of bills in an accurate manner so that controls of accounts receivable are automatically established. The daily elimination of the paid accounts, balanced with the cash receipts, leaves only unpaid accounts to be handled, and the close of the regular collection periods finds only a comparatively few accounts on which shut-off service is necessary.

Former Method in Cincinnati

To illustrate the unusual success attained by the Cincinnati water works, a brief comparison of the old register sheet plan with the stub will be enlightening.

Eighty-nine employees were necessary to operate the meter reading, billing and customers' accounting functions under the register sheet plan. Meters were read monthly, readings being posted on field cards, and these readings were transferred to office ledger cards. Many errors were made in these transfers. Sheets were listed showing the customers' accounts numbers, and bills were machine-addressed in the same sequence. The bills were completed to show present and last meter-reading dates, present and last readings, consumption and amount, and these data were carbonized on the register sheet—by means of non-adding typewriters. When the billing for the month was completed, the sheets were totaled to obtain the charge for the month. The bills were delivered by meter readers. The last date of payment, the bills having been dated the first of the month, was the 20th, and the receipts were so heavy that it was often the 28th before all payments were credited. The ensuing month's bills were delivered from the 25th on, so that it was impossible to carry forward unpaid balances. On the 10th of the second month shut-off

NEW OFFICE ARRANGEMENT, SHOWING BOOKKEEPING MACHINES AND STUB-FILING CABINETS, DEPARTMENT OF WATER WORKS, CINCINNATI

FRONT AND BACK OF METER READING SHEET, AND TWO TYPES OF METER REGISTERS USED

bills were prepared on the delinquent accounts, and very frequently service was discontinued where the customer had paid the current bill while the turnkey was attempting to collect the delinquent. The number of small bills made the billing and collection costs all out of proportion to the revenues received. In 1928 the volume of operations reached a point where it was almost impossible to continue on a manual basis, and a survey was made recommending the quarterly reading of meters, elimination of ledgers by the use of the stub plan, and the installation of billing machines for post-card billing.

Present Plan in Cincinnati

Meter reading sheets are machine-addressed, showing permanent account number (arranged in geographical sequence for meter-reading routes), meter number and service-branch number, name of customer, address, mailing address if other than premises supplied, location of meter, size and make of meter, and permanent specific information concerning the account. These sheets are kept in binders and are taken out by the meter readers four times a year. On the return of the meter-reading books to the office, consumption is computed, together with the amount of the charge, notices are sent to customers in cases of excess consumption, and the Bureau of Meter Repairs is notified of "stuck" or defective meters. The books are then passed to the billing unit.

Three-part post-card bills are used, comprising a customer's bill with cashier stub, office record and delinquent notice. The bills are addressed on an automatic addressing machine at the rate of 2,500 an hour and are checked with the meter books just before meter readings are obtained, to insure a bill for every meter and a meter sheet for every bill. At this time the bills are arranged in groups of thirty. An audit sheet, which will provide for thirty accounts, is inserted in the billing machine with a sheet of carbon paper. The bills are fed into the machine, and the dates of the last and present meter readings, the numbers of the last and present meter readings, the consumption of water in hundreds of cubic feet, and the amount of the charge, are entered on the bill and office record. The amount only is indicated on the cashier's stub. While a delinquent notice has been included at the time the entire bill was printed, these are detached and filed away until required, as our experience has shown that with only 15 per cent of the accounts being unpaid at the expiration of the payment date, it has been practical to remove the notice only on that 15 per cent and destroy the 85 per cent which had been paid at that time.

The audit sheet fits the billing machine in such manner that a complete transcript of the bill is carbonized on this record, and when the unit of 30 bills has been completed, a total of the consumption, together with the amount, is tabulated, and these amounts are used for journalizing purposes. The repetition of the dates on the bill on this record is purely mechanical and is absolutely correct. An operator of this machine, under the present system, averages 1,400 to 1,600 bills per day and, should it be necessary, this production may be speeded materially through the use of continuous rolls of paper for audit sheets.

At the conclusion of the billing, the bills, audit sheets and meter books are referred back to checkers, who verify the posting of the data to the correct bill and prove the details of the consumption with the revenues being billed. The meter books are then filed away in fireproof cabinets specially arranged to house these records, and the bills are retained until the billing date scheduled for release.

On the day prior, the office records are detached from the bills, unpaid balances carried forward to the bill, and the bill run through a postage meter machine and stamped with a first-class one-cent postage permit. Incidentally, the bills are printed on Government post-card stock and, when completed through the severance of the office record and delinquent notice, become the size of a perfect Government post-card, and by having "Post-Card" printed on the address side, together with the return address of the Department of Water Works, are entitled to first-class postal treatment. An advantage in the use of the post-card bill is the saving effected through the nonnecessity of using envelopes; that they show the time of mailing the bill, thus saving many needless controversies through the geographical arrangement for delivery by the letter carriers; and by reserving the meter readers only for reading meters. The latter advantage is very important, in that it enables the scheduling of operations without any detraction from their primary duties. The cost compares favorably with that of personal delivery, but more important than any other reason is the fact that all bills are delivered at one time.

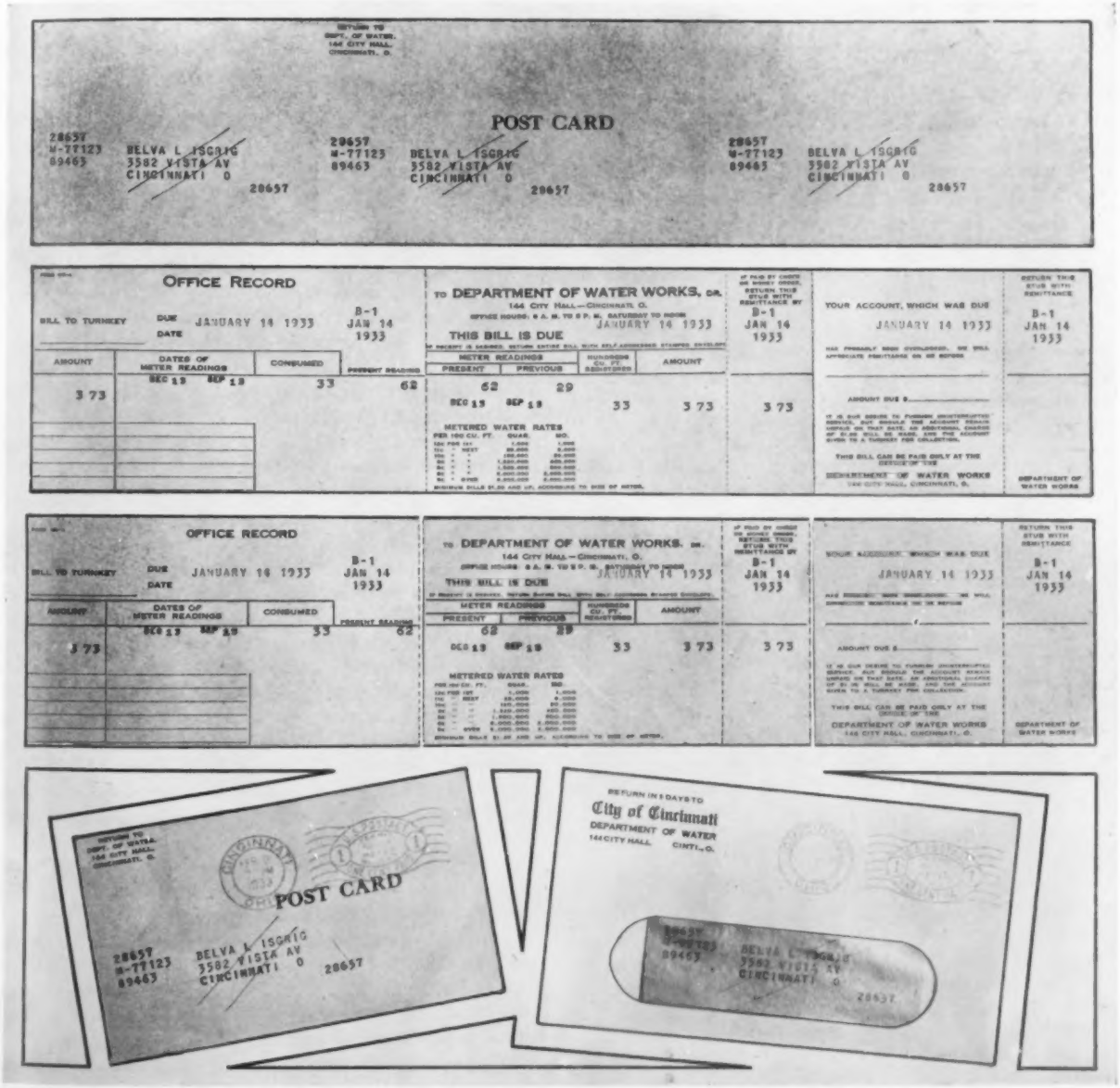
Just before release of the bills to the customers the audit sheets are totaled, and this total is furnished the bookkeeper as a charge against "Accounts Receivable Consumers Revenues," and also against the account clerk assigned that unit. The "office records," which are commonly known as accounting stubs, are then passed to this account clerk, who becomes responsible for these accounts.

As payments are received, either by mail or at the cashiers' windows, the cashiers' stubs are stamped with the date of payment and the cashier's number, together

with the bill if the bill is returned with the stub, and these stubs are totaled at intervals to balance with the cash. Each cashier is required to complete a cash report grouping all meter revenues, regardless of districts or zones, and separating all other receipts by classes of revenues.

The stubs are then passed to a distribution clerk. This clerk separates the stubs into zones, and by means of a non-listing adding machine takes a total of each zone, and the total of these zones must equal the grand total of meter water revenues reported for each cashier. When each cashier has been balanced by the distribution clerk, a similar report is prepared in triplicate for the total of all the cashiers' collections by zones for meter revenues, and by classes of revenue for other receipts. The original of this report is furnished to the general bookkeeper, the duplicate to the head cashier, and the triplicate is retained by the distribution clerk for balancing with the account clerk. A bank deposit sheet is then prepared showing checks and currency received by each cashier, in triplicate. The original is left at the bank with checks and currency, the duplicate is sent to the City Treasurer, together with the bank acknowledgment of the deposit, while the triplicate is retained by the head cashier.

After the cashiers' totals have been proved, the stubs are passed to the account clerks, by zones. These clerks arrange the stubs in folio numbers and remove the corresponding account stub from the files. In the event of an over- or under-payment, the amount is credited to the account stub, which is placed back in the file, and a memorandum of the amount credited is placed among these stubs which have been removed, to be used later for balancing purposes. When all stubs, representing pay-



THE COMPLETE BILL AND DELINQUENT NOTICE USED BY THE DEPARTMENT OF WATER WORKS, CINCINNATI, OHIO

Top row, face of the three-part post-card bill addressed; second row, the reverse, showing the office record, the section mailed to the consumer, and the delinquent notice; third row, the three sections detached—at the left, the office record which goes to the Account Clerk, in the center the bill to be mailed to the consumer, and, at the right, the delinquent notice which is filed for future use if necessary; fourth row, at left, the bill, with postage meter stamp, and, at right, a delinquent notice ready to mail in a window envelope

ments by cashiers' stubs, have been removed, an adding machine total is taken of the amounts, and the amount tied with the distribution clerk's total for the zone. When this balance has been proved, the accounting stubs are stamped with the date of payment and filed in the paid or closed section of the cabinet.

At the expiration of the date of payment, approximately 85 or 90 per cent of the accounting stubs comprising the unit have been removed, balanced, and filed in the paid file. The remaining 15 or 10 per cent represent unpaid accounts. On these records the delinquent notice is removed and completed with the necessary information, and these notices are mailed in window envelopes, the reason for this being that it is against the postal regulations to mail dunning notices on post-cards.

At the expiration of the second payment date, a bill is prepared in triplicate. This is a fanfold bill, of which three copies are prepared, the original serving as a cashiers' guide, the duplicate as a turn-off foreman's record, and the triplicate as the turnkey's or collector's bill. On all these accounts a penalty is set up, of $1.00 or $1.50, for city and county accounts, respectively, and a blanket charge for this amount is sent to the general bookkeeper to be set up against that billing unit.

Payments returned by turnkeys are handled as regular collections. Failure to receive remittance ordinarily results in the shutting-off of water service, but in these times discretion is used to the extent of granting extensions of time of payment for worthy accounts.

Adjustments of customers' accounts are provided for through the issuance of credit memorandum forms in duplicate, of which the original is sent to the general bookkeeper and the duplicate to the account clerk for the posting of the accounting stub.

Checking New Accounts

In Ohio cities, water rents are assessed against the property, and in accepting an application for water service, this application is checked against the accounting file, and if there is no accounting stub in the unpaid file, the account is O.K. for service. This is done with the assurance that all accounts have been paid to that date. If there is an unpaid account, it is necessary that the owner or new consumer pay the delinquent bill before services will be re-established. These applications for either the turning-on or shutting-off of water are taken in person, by telephone, or by mail, as the customer's signature is not essential, and are written on an automatic register, which contains six copies of fanfold forms. The original is filed numerically in a permanent binder and gives a complete sequence of all orders; the duplicate is sent to the turnkey foreman; the triplicate is sent to the turnkey foreman and turned over by him to the turnkey; the quadruplicate is used in the office as a check copy; the fifth copy is sent to the Addressing Division, and the sixth copy to the Meter Division. Upon the turning on or off of the water by the turnkey, the date and the meter reading are entered on his copy, which is passed to the foreman, who removes his copy from a pending file and returns the turnkey's copy to the office. Here the office checking copy is removed from the pending file, and the information necessary for the establishment of final billing of an account is noted and copied from the office record to the meter sheet, after which the account is billed.

Advantages of Stub Plan

In the Cincinnati area there are approximately 96,000 consumers. A schedule has been arranged so that approximately 12,000 accounts are billed quarterly every ten days. Bills are rendered on the 5th, 15th and 25th, and are payable on the 15th, 25th and 5th, respectively. Three accounting clerks handle these 96,000 accounts by the establishment of recurring billing periods. Prior to the mailing of the ensuing bill for the unit, each account clerk balances with the general bookkeeper in detail. The outstanding feature of this arrangement is the setting-up of all charges, and the crediting of all cash receipts and allowances by the general bookkeeper, thus establishing absolute control and the proving of these totals by the individual account clerks.

The stub plan of accounting offers the following advantages: elimination of all "paid" or closed accounts; an absolute proof of crediting all payments; corresponding reduction in the number of accounts to be handled in following up unpaid accounts; absolute assurance of balance at close of billing period through proof of posting of credits; minimum of effort in preparation of delinquent notices and turn-off bills, and in carrying forward unpaid balances to new bills.

The stub plan affords a greater flexibility for the application of mechanical billing equipment than any other method, and has been proved to be the best means of expediting the preparation of bills and accounting for customers revenues. In water-works billing, particularly, it is indispensable, since the meter books, previously described, carry a complete record of the consumer's account, and it has been necessary to refer to the account stub only to determine the date of payment.

Other innovations provided by the stub plan cover service branch applications, meter service applications, and special sales of water, usually consisting of water used for construction purposes. It has also been adapted to the billing of meter repairs, and an absolute control of all those units is placed with the general bookkeeper. The multiplicity of operations through highly specialized units prevents any possible collusion in mishandling accounts, and since each unit must balance individually and collectively, it has been proved that the stub plan of accounting is the most practical for the frequent billing of a large number of consumers.

In summarizing, it should be noted that the stub plan accounting, supplemented by modern mechanical equipment, provides for a minimum of personnel, preparation of neat, accurate bills, the establishment of absolute controls, and a means of intelligent collection of delinquent accounts so as to maintain favorable public relations. In Cincinnati, where the plan was installed in 1930, an immediate reduction in operating costs in the Commercial Division of $125,000 a year resulted in a reduction of rates of $300,000 a year on May 1, 1931. Personnel was reduced from 89 to 44 and those dropped from the water-works payroll were transferred to other city departments during the installation. A total of 11,000 new accounts have been absorbed without adding personnel, as the mechanical procedure can take care of this increase. Further economies effected since that time have resulted in a second reduction in rates on April 1, 1937, of $265,000.

A New Water Supply for Innisfail, Queensland

"Two-Million-Dollar Sugar Town" Insures Supply Throughout Year with New Pumps and Filtration Plant

By JACK MULHOLLAND
Consulting Engineer, Brisbane, Australia

NEED of a reliable water supply had been apparent in Innisfail, Queensland, Australia, for several years prior to the start of active work in 1933. Like many projects in other British Dominions and in the United States, the work was subsidized as a project for the relief of unemployment. Innisfail, popularly called "The Two-Million-Dollar Sugar Town" of the North, is on the coast and situated 986 miles north of Brisbane, the capital city of Queensland. Its extravagant name is the result of the annual production of cane sugar, which constitutes the mainstay of the wet coastal belt.

Although subject to a heavy rainfall, particularly in the first quarter of the year, Innisfail, with an average precipitation of 140 inches, still felt the need for a municipal supply to insure an ample quantity of wholesome water at all times. In 1933, when the town embarked upon this project, Queensland was feeling the effect of the world depression, with consequent unemployment. To alleviate unemployment, a state relief tax varying from 1.25 to 5 per cent was imposed upon all incomes, the revenue therefrom being wisely used for financing public works, such as road construction, water supply and sewerage. Innisfail received its share through a subsidy of $122,000, or approximately one-half the cost of the project.

The scheme in essence is a pumping supply from the North Johnstone River, ten miles by water upstream from the town, and includes two pumping stations, a modern rapid sand filtration plant, fifteen miles of trunk main, a distribution system and an elevated reinforced concrete service reservoir.

Construction began in April, 1933, and wet weather set in at the same time. As if in defiance of the new rival supply, there continued for the next sixteen months one of the wettest periods on record, during which 24½ feet of rain fell in 312 wet days. Work went on steadily, however, with an almost complete absence of any of the sicknesses typical of this tropical wet belt. On August 17, 1934, pumps were started, and the first water was delivered into the high-service reservoir in the town. Within one week all tests had been completed, and the Council advertised that it was prepared to supply water upon demand.

River Pumping Station

The river pumping station comprises a concrete-lined tunnel 80 feet long, within which the suction pipes run, connecting the centrifugal pumps at the bottom of the 12-foot diameter reinforced concrete wells with the Johnstone River. The pump well is 40 feet deep.

The 415-volt, 3-phase slip ring type electric motors are at the top of the well away from flood dangers, and are housed in a concrete building. All pumping equipment is in duplicate for safety, and the capacity of each unit is 30,000 Imperial gallons per hour. The pumping plant is remote-controlled from the filtration plant located one-half mile nearer the town.

Filtration Plant

The water enters the rapid sand filter plant over a V-notch weir equipped with a Kent recording meter, and then enters a mixing chamber where alum and lime are added, and coagulation takes place during the 20-minute detention period before the water passes on to the sedimentation basin. This basin is built against the back of the filter house proper and monolithic with it, and is of rectangular form, holding 120,000 Imperial gallons. The bottom is hopper-shaped with four troughs. Across each

THE RIVER PUMPING STATION AND INTAKE OF THE INNISFAIL WATER WORKS

is a 4-inch perforated sludge pipe with a control valve located outside the basin, so that the sludge may be removed from the troughs as desired.

Following a four-hour settling period during which practically all the silt and color are removed, the water enters one of the four rapid sand filter beds which deliver the filtered water to a 100,000-Imperial-gallon clear-water basin. Duplicate horizontal centrifugal Clyde pumps housed on the ground floor of the filter building force the filtered supply through 4 miles of 9-inch main up to the high-level reservoir in town. A venturi meter records the quantity of water pumped from the plant.

This high-pressure pumping installation is interesting, for the pumps are of single-stage construction working against a head of 150 feet with an efficiency of 67 per cent. The vertical pumps at the river are of the same manufacture with an operating head of 100 feet and an efficiency of 74 per cent.

The clear-water basin is 42 feet in diameter and is covered with a 4-inch reinforced concrete dome to guard the filtered water from algae growths.

requiring 28 hours. The outer formwork was completed and the inner sheeting was raised foot by foot as concreting progressed. The slowness of the pouring operation was compensated for by the excellent result, since no single leak or weep has developed, with but one exception of a spot which was calked up in a few minutes some time later.

All concrete proportioning throughout the scheme was based upon the "fineness modulus" method, which gave complete satisfaction. In some parts, a 4 per cent admixture of diatomaceous earth was found useful in maintaining a low water cement ratio for a rather harsher aggregate.

Pipe Lines

A 9-inch mild steel pipe bitumen-dipped and wrapped externally and cement-lined by the centrifugal or Hume process with ¼-inch of cement was laid through canefields and swamps for the main connection between the high-pressure pumping station and the service reservoir.

THE INNISFAIL FILTRATION PLANT JUST BEFORE GRADING WAS COMPLETED

The High-Level Reservoir

The high-level reservoir of 100,000 Imperial gallons capacity is built of reinforced concrete on a 70-foot central tower and 8 peripheral columns. Access to the top of the tank is provided by a stairway up the central tower, and a central shaft through the tank itself. The top of the dome is 85 feet above the ground and provides a popular scenic lookout from which visitors obtain a panoramic view of the richest lands of Queensland, lying within the shadows of the Bartle Frere and Bellenden Ker ranges.

The design of the concrete tank is interesting for it is typical of a trend in Queensland towards thorough and detailed mathematical analyses of high water-holding structures in which the architectural features have not been completely overlooked for utility's sake. Another similar tank of 120,000 Imperial gallons capacity on a 100-foot tower has just been completed at Longreach by the State Irrigation and Water Supply Department, and a similar tank of 100,000 Imperial gallons capacity on a 100-foot tower is now being designed and built by the author for the town of Ingham, which, like Innisfail, lies within the cyclonic coastal belt of North Queensland. A wind velocity of 120 miles per hour was allowed for in the design.

A feature of the construction of the Innisfail tank was the pouring of the tank walls 13 feet high in one operation,

The distribution system comprises a total of 12 miles of 9-, 6-, 4-, and 3-inch cast-iron mains, with fire hydrants at intervals of not more than 300 feet. Lately there has been a trend towards a minimum pipe diameter of 4 inches, a requirement now specified by the Fire Underwriter's Association of Queensland.

Control Equipment

A feature of the plant design and operation is the control of all operations from a centralized point at the filtration plant. Here the river pumps are remote-controlled by push-buttons operating on an electrical circuit in the starter panels of the motors. No-volt, no-water, and overload releases protect these remote-controlled pumping units.

Accurate flow meters at the filtration plant on both the inlet and outlet mains check the daily consumption and the amount of water waste around the filters.

Housed in the filtration plant is a "Gent" recording clock controlled electrically from a transmitter at the tower 4 miles away which sends a continuous signal to the plant, indicating the height of water in the tank. The charts are renewed weekly and provide a permanent record of water storage in the system at all hours of the day and night. All parts of the water-supply project are connected by telephone.

Apart from the water-level recorder and water meters, all machinery and equipment for the Innisfail water supply was manufactured in Australia.

Dry Spell Booms New Supply

Nature, as if to make amends for the extraordinarily severe weather conditions during the construction period of the Innisfail water supply, then turned kindly, and, for the six months after water became available, one of the driest periods on record was experienced, resulting in 70 per cent of the entire town connecting with the new town water supply. Since then the number of consumers has steadily increased, until now there are just over 3,000 people deriving the benefits of the new community supply.

Testing Enamel Lining of 36-Inch Pipe

Los Angeles Department of Water and Power Has Novel Perambulator

THE 36-inch Stone Canyon trunk line, an electrically welded steel tube just built at an estimated cost of $1,127,000, is a part of the Los Angeles water-works program that has been undertaken with the assistance of a PWA grant. A specially built pipe perambulator converted this trunk line into a miniature subway while construction was under way. The unique car shown in the accompanying illustration made trips each day through the dark pipe interior on Water Bureau business.

The perambulator is used to detect any spots inside a pipe that might not have received an adequate coating of the protective enamel that assures long life for steel water mains. A circular steel brush, electrically wired, establishes contact against the pipe surface and throws off sparks when a bare or thinly coated spot is encountered.

Formerly this testing was done by hand, a laborious job that required much time. Now the little three-wheeled vehicle rolls through the pipe and does the same job in a fraction of the time formerly required.

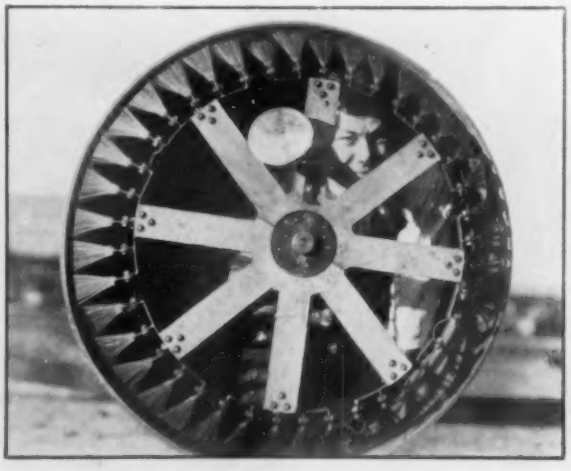
Officially known as an inspector's carriage, the machine was designed and built in the Water Bureau shops. Two 140-ampere-hour storage batteries operate an electric motor which transmits power to the two rear wheels through a chain drive. Ten hours of operating use can be made before it is necessary to recharge the batteries.

A single wheel in front is used for guiding the vehicle. The steering wheel can be used as a spare tire if one of the three pneumatic tires is punctured. The wheels are 10 inches in diameter.

Although this unusual vehicle was designed and built for normal use in pipe lines of 36-inch diameter, the perambulator can be partially collapsed so that it can pass through valve openings as small as 20 inches in diameter. When these smaller passages are encountered, the operator pushes his transportation through the opening, crawls through afterward, and resumes his subterranean ride through the pipe.

As sections of the 15½-mile trunk line were installed, they were given a final check with this machine. It is important to have the pipe completely protected w.th enamel in order to prevent rusting and thus lengthen the life of the pipe. Places not properly covered were marked for painters who followed up the detector.

THE AMERICAN CITY is indebted to the Los Angeles Department of Water and Power for the photographs and information on which this article is based.



THE DEVICE DEVELOPED TO TEST THE INTERIOR ENAMEL PROTECTIVE COATING OF 30-INCH PIPE OF LOS ANGELES WATER SUPPLY

These photographs, taken in the Water Department yard, show Howard Waite, the inventor of the machine, seated in the midget car, and looking out from behind his testing device inside a 30-inch pipe

Well Supply from Fine Sands Increased During Drought

A Report on Ten Years' Operation of the Amarillo, Texas, Ground Water Supply

By E. T. ARCHER
Consulting Engineer, Kansas City, Mo.

TEN years ago, the city of Amarillo, Texas, completed its present ground water supply, which has not only given continuous service during the past ten years but has increased in capacity in proportion to the enlarged demands of a population that has risen from something like 25,000 to 50,000 without any change in water-producing facilities.

Amarillo is located in the section of the country generally designated as semi-arid, where the rainfall is very light, which prohibits the construction of impounding reservoirs or surface supplies. Up to the time of construction of the present water supply, the city was continually faced with water shortage, for it had endeavored to secure its supply from numerous wells in and around the city, the demands on which had outgrown the production of the underground strata in that section.

Wells in Palo Duro Canyon

The present supply is located about 16½ miles from the city in the valley of the Palo Duro Canyon and consists in general of a series of ten wells constructed about an artificial lake. This location was chosen and the plant designed by the late Wynekoop Kierstead, who conducted a series of tests covering an area of several miles around the city.

The Palo Duro River rises near the New Mexico border and meanders across the state, flowing into the Red River near the Oklahoma line. Its lower course is marked by arroyos and deep canyons eroded to the Red Beds, while the upper course has been filled with silt and sand from wind erosion, presenting only a small depression below the natural level of the ground. It is on this upper section that the city's present water supply is located. The tests show a depth of about 175 feet to the Jurassic beds, the bottom 30 feet of which consists of exceedingly fine sand passing a screen of from 50 to 100 meshes per inch, averaging about 80, and overlaid with sand, silt, clays and other eroded materials. It is out of this lower stratum of fine sand that the city's present water supply is secured from ten gravel-wall wells.

In order to insure the permanency of this well supply, a dam 42 feet in height was constructed across the Palo Duro Canyon, creating a reservoir of about 500 acres. For the first four or five years, no water was impounded in the reservoir, after which varying quantities were accumulated, and at one time the water was within about 6 inches of the spillway. At the time of the writer's inspection, the reservoir was about one-third full. The gradual rise and fall of the water level in the lake exposes a considerable area of the bottom and sides, which under the intense heat of summer cracks the layers of silt and, as the water rises, permits it to percolate through into the lower sands, thereby continuously replenishing the lower sand stratum from which the city's water supply is secured. It is this continuous accumulation of ground waters from the flow of the Palo Duro Canyon and adjacent territory, augmented by the waters in the artificial lake, that maintains the ground water level of this underground supply.

Gravel-Wall Well Construction

The wells proper are of a unique design and a distinct departure from the standard practice of gravel-wall wells of that day, inasmuch as they reversed the accepted practice of holding out the fine sands with screens, by using open screens instead, and drawing in the fine sands and ejecting them from the well, gradually replacing this sand with gravel. This result is accomplished by developing the well by a system of air injections followed by operations by air-lift and back-blowing, and later by centrifugal pumps after all fine sand has been removed. This method of construction was developed by P. S. Judy, of the Air Made Well Co.

The development of the wells required the introduction in each well of approximately ten cars of screened gravel, ranging in size from ¼- to 1¼-inch, averaging approximately ¾-inch. The wells are arranged for back-blowing and upon completion were back-blown at frequent intervals; this is now done about every six months. Even up to the present time, the process of back-blowing requires about ½-cubic yard of gravel to replace the fine sand extracted.

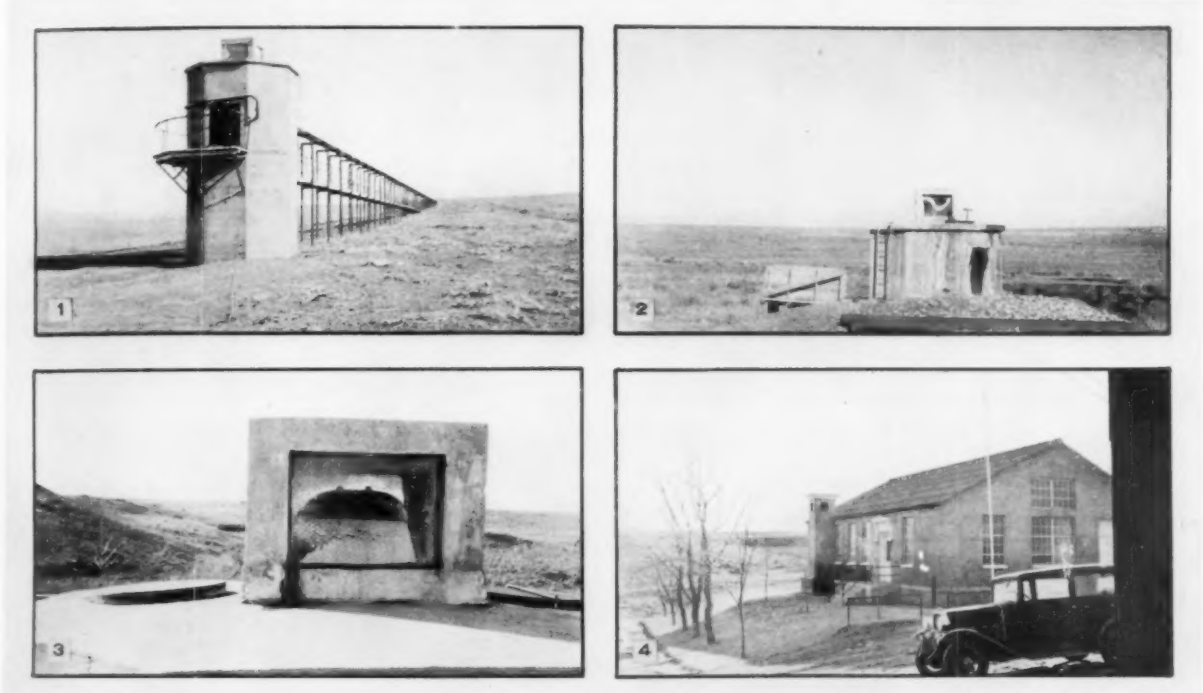
From tests carried forward at the time of completion of the wells to determine the extent of the area replaced by gravel, it was found that in some instances the gravel had traveled a distance of 28 feet from the well. There seemed to be no uniformity of distribution of the gravel, as in some instances the gravel had traveled all in one direction and usually against the flow of the ground water.

When the wells were first put into service, they gave a capacity of approximately 160 gpm, which was gradually increased by back-blowing and replacement of fine sand, until at the present time they will deliver about 700 gpm each. Eight of the wells continue to be operated by air-lift, and two by centrifugal pumps. The water passes

through sand-traps at the wells and is transported through gravity pipe lines to a small reservoir adjacent to the pumping plant.

Pumping Plant

The plant proper consists of an air-compressor station, comprising two angle-compound compressors operated with 300-hp motors, and two high-lift centrifugal pumps operated by 150-hp motors. These two pumps force the water from the surface reservoir through a 30-inch pipe to the reservoir in the city, a distance of some 16½ miles, at a maximum elevation of about 100 feet. The entire plant consists essentially of the ten wells, artificial lake,



THE NEW AMARILLO, TEXAS, WELL-WATER SUPPLY

1. A well head at the edge of the lake, showing the gravity water lines to the reservoir. 2. A well head, showing the replacement gravel. 3. Close-up of a well head with the air-lift in operation. 4. Front view of the compressor and high-lift pumping station

air compressor and water pumping plant and 16½ miles of 30-inch cast iron pipe.

The city's water supply demand at the time of completion of this project was in the neighborhood of 2½ million gallons per day, which rose rapidly until the average for the summer of 1936 was 6,400,000 gallons, with a maximum of 9,024,000 gallons on July 27, 1936.

Power Costs

The plant is operated by electricity purchased from the local utility on the basis of 1.81 cent per kwh. For an average of five months during the past year, the cost was as follows:

Production	1.626c	per 1,000 gallons
Transmission	0.969c	" " "
Distribution	1.030c	" " "
Total	3.625c	" " "

This represents the total operating cost delivered to the consumer, who is charged at the rate of a maximum of 27 cents per 1,000 gallons, graduated to 12 cents per 1,000 gallons; rates which produce ample revenue to operate, maintain, and finance the Water Department and still give the customers an advantageous rate for water, particularly in this section of the country.

Supply Continues Satisfactory

The State Board of Health on its last examination gave the water a rating of 99. It has a hardness of only about 15 grains, which is unusual for this section and is slightly less than at the beginning of operation, owing probably to the percolation of the water into the well stratum from the artificial lake.

In recent months, it has been discovered that fluorine is present in the water, which might be expected throughout this section of the country. Steps are now being taken to eliminate this trouble, which will give the city an abundant supply of an exceptionally good quality.

Auxiliary Supply Developed

Some four years after starting operation of this system and before any water had accumulated in the surface reservoir, the city officials became fearful that this supply might decrease as it had done in their earlier wells, although it had shown no such indications, except that the water level in the wells had receded somewhat. They therefore proceeded with the development of an adjacent water supply 2½ miles from the city, where five gravel-

wall wells were constructed in the usual manner and equipped with turbine pumps. These five wells gave an initial capacity of 5 million gallons per day at the beginning of operation, receded quite rapidly, and at the end of four or five months ceased entirely, but by allowing them to stand idle for several months the operation could be repeated. However, the initial capacity of the wells at each operation decreased, until at the present time the maximum starting quantity is only about half what it was at the beginning, and the operation can be carried forward only about two months. Also, the cost of operation has increased considerably, and now exceeds the cost of operation of the supply at Palo Duro, although at the beginning it was somewhat lower, indicating that the sands have packed around the screens and have cut the runners of the turbines, materially decreasing the efficiency of operation.

Palo Duro Supply Increasing

The outstanding engineering feature of the city's Palo Duro supply is the fact that at the end of a period of ten years of operation the supply is greater than at the beginning, demonstrating that it is possible to extract approximately 1 million gallons of water per well per day from a stratum of 80 feet of exceedingly fine sand, and illustrating that these results can be secured only from a well development in which the fine sands are continuously extracted and replaced with gravel during operation.

The usual method of holding out the sands by fine screens and gravel formations has been illustrated by the other installation, in which the capacity of the wells was constantly diminished by continuous pumping.

This installation has created considerable interest throughout the water-supply industry, and visitors are frequent, some of them coming from long distances and expressing great amazement at the amount of water produced from this exceedingly fine sand.

Conclusion

The plant is efficiently managed and properly maintained by H. R. Smith, City Manager, to whom the writer is indebted for many courtesies extended in the collection of the data required for this article. During the summer of 1936, I had occasion to make an automobile trip through the Southwest, and town after town through which I passed was either short of water or had water rates so high that the grass in the parks, and the lawns, shrubbery, and shade trees were either dead or dying. But when I drove into Amarillo, the outstanding sight was the large amount of green shrubbery and beautiful green lawns. It was almost like coming into an oasis in the desert. Many lawns had two or three sprinklers in operation, and in comparison with the other sections this was a City Beautiful, owing to the design and competent business operation of the city's new, adequate and abundant well water system.

From the Harvard Department of Regional Planning

THE Harvard Department of Regional Planning has devoted this academic year almost exclusively to research. Next year, however, with renewed appropriation it takes up its teaching again as the Department of Regional Planning, coordinate with the Departments of Architecture and Landscape Architecture in the Graduate School of Design.

Naturally, it does not attempt to cover everything which might be included under the overworked word "planning." We have now come in this country to the belief that communities should comprehensively plan their whole "plant" so that appropriate areas should be allocated to appropriate uses, and the right things put in the right places, in order that each private individual effort and each community effort may serve both its own ends and the good of the whole. It is the application of foresight and intelligence to this planning of the physical environment of mankind which the Harvard Department of Regional Planning especially concentrates upon. We are well aware that although this planning manifests itself ultimately in the physical pattern, it absolutely must take into account aspects from other points of view as well. Its final purposes are, of course, social. Its considerations of efficiency and cost are economic. The process by which its findings are given the authority of the community and then administered are legislative and governmental.

Regional planning, as a profession, challenges the practitioner with a broad field of activity presenting constantly new and unsolved problems. It offers an opportunity for real public service in improving living conditions and the environment of cities, where an increasingly large percentage of our population will spend their lives, as well as of the more open country, without which the cities and the nation could not exist.

The Harvard Department requires a bachelor's degree for candidacy for its master's degree, which it gives at the end of three years or less, according to the student. It admits also special students. It has close contact with the instruction in the other physical planning professions of architecture, landscape architecture, and engineering, and it offers an exceptional opportunity through the access of its students to other work in the University, especially in economics and government, which are rapidly developing at Harvard along practical and creative lines in contact with the new problems of the present day.

HENRY V. HUBBARD,
Chairman.

Summer Planning Conference

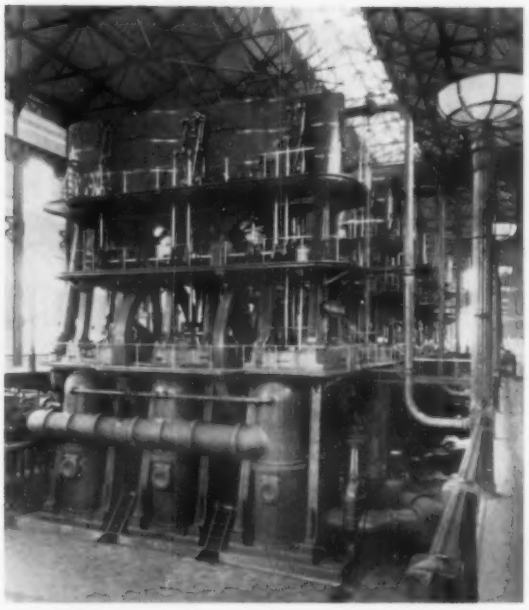
RECOGNIZING the need for a short summer course in city and regional planning for both technicians and laymen, the School of Architecture of the Massachusetts Institute of Technology, cooperating with its Summer Session Committee, and the Graduate School of Design of Harvard University are inaugurating what it is hoped will be an annual series of Summer Conferences on Planning. The first group of lectures and discussions (Group A), given from June 14 to June 25 inclusive, will be devoted to basic planning principles. Group B will consist of lectures and discussions on planning techniques and will be given during the third week of the Conference (June 28-July 3). Group C, given during the final week (July 5-10), will be devoted to planning administration. A special summary series of lectures on planning principles will be given for the benefit of those who register for only the third or fourth week.

Afternoon sessions will be devoted to supervised design and research projects selected to meet the special needs of the individual students. Housing, rehabilitation of blighted areas, highway design and location, land subdivision, private deed restrictions, public open-space systems, and zoning, are typical examples of the subjects in which students may engage in individual directed research or drafting-room problems.

All sessions of the 1937 Conference will be held in Robinson Hall, Harvard University, Cambridge, Mass., harboring the most complete planning library in the world. Register with Frederick J. Adams, 491 Boylston Street, Boston. Fee $75 for the entire conference, including $5 for registration. Individual fees payable for the different groups.

Key Parts of the Buffalo Water Works

ABOVE—EXTERIOR OF THE COLONEL WARD PUMPING STATION



RIGHT—INTERIOR OF THE COLONEL WARD PUMPING STATION, SHOWING THE HIGH-DUTY STEAM PUMPING ENGINES

ABOVE—THE FILTRATION PLANT

LEFT—ELECTRIC-DRIVEN PUMPS AT THE FILTRATION PLANT

THE EAST FERRY STREET TANK, ONE OF THREE SIMILAR 2,000,000-GALLON UNITS RECENTLY COMPLETED

Grounding of Electric Currents on Pipes May Damage Water-Works Structures

Water-Works Officials Urged to Report Cases to the American Research Committee on Grounding

THE American Research Committee on Grounding was formed early in 1936, under the joint auspices of the American Water Works Association and the Edison Electrical Institute, with members from some fifteen national organizations which are directly concerned with the problem of electrical grounding. At the first meeting of the Committee, the following resolution, setting forth the Committee's objective, was adopted: "To investigate and report upon, as conclusively as may be: (a) electrical grounding connections, made to water, gas, or drainage pipes, with respect to the effects of any kinds of electrical current thereby caused to flow, upon (1) the pipes, (2) the contents of the pipes, and (3) fire and personal hazards; (b) conditions in the electrical circuits involved which produce current flow over pipes; (c) measurement of stray currents; (d) efficiency of electrical grounding." A Technical Sub-Committee was appointed to make field investigations and technical studies necessary for a thorough review of the subject. This Committee will examine all available information, determine the pertinent physical facts and report to the Committee its findings, from which it is hoped an engineering solution of this complex problem may be developed which will be acceptable to all parties.

The introduction of alternating current and the use of 2,200-volt primary distribution circuits made the grounding of secondary distribution circuits necessary as a safety measure for the protection of life and property. The most effective grounding electrode available on a consumer's premises is the continuous metallic underground water piping system. Water pipes appear at numerous points throughout the house and are interconnected or in contact with steam pipes, gas pipes, etc. Grounding of electrical circuits to water pipes, if available, is required in the National Electrical Code. A more complete statement of the grounding situation as it now exists was published in the April, 1937, number of a pamphlet called "Industrial Standardization," issued by the American Standards Association.

The Problem in England

A similar problem has presented itself in England, and with the approval and collaboration of the Institution of Electrical Engineers, the Institution of Water Engineers, and the Water Association, a sub-committee on "Earthing to Metal Water Pipes and Mains" was set up in the fall of last year. The announcement of the appointment of this committee contains the following reference: "Many cases have arisen where corrosion to water mains has been attributed to, and in some cases proved to be due to, such earthing (i.e., grounding), and there have been instances where electric shocks have been incurred during the repair of water mains. While it is generally accepted that continuous current causes electrolytic corrosion where it leaves a metal conductor or pipe to earth, there is some doubt about the action of alternating current."

The purposes of the English committee are as follows:

"To explore the problem of possible injury to metal water pipes and mains through the earthing thereto of electrical installations, particularly in relation to alternating currents with a view (a) to investigating the existence and extent of such injury, research being carried out if necessary; (b) to obtaining a mutual agreement on the conditions under which earthing connections to water pipes and mains might be made, and (c) formulating, if necessary, a set of regulations in respect thereof."

In England there seems to be a definite feeling that stray alternating currents may be a deteriorating influence. The effects of stray direct current and methods for protection of metallic structures are well known in this country and abroad. Stray alternating currents, especially when superimposed on direct currents, even if the latter are of low intensity, arising from galvanic couples or from difference in soils, may have the tendency to increase the rate of corrosion. If this can be proven, the question of grounding of alternating currents to water-pipe structures when accompanied by flow of stray current may be of greatest importance to the life of water-works structures and also may produce deterioration of the quality of water.

Tastes and Odors

In recent years, there have been complaints of objectionable odor, taste, color or sediment in water or deterioration of metallic structures which could not be accounted for or remedied by accepted water-works methods. This type of trouble has apparently been confined to one or a few houses in a given locality. Experience of some water purveyors has indicated that this may be due to stray currents on water-service pipes, as the removal of stray currents has in time appeared to eliminate the complaint. Actual field observations on the premises indicate a wide variation in the internal conditions of buildings with particular reference to the details of the water-piping system and of the electrical system.

The attention of many of the water purveyors throughout the country is frequently drawn to complaints which may involve some of the above-mentioned factors where accepted methods of correction fail. If any water superintendent comes across a situation of this kind, or one where electric shock is involved, it would be exceedingly helpful to the American Research Committee on Grounding and all concerned, if such were reported directly to the Committee. The Chairman of the Committee is H. S. Warren, Bell Telephone Laboratories, New York City, and the Secretary, Charles F. Meyerherm, 511 Fifth Avenue, New York City.

The Lockport Incinerator, Built for Easy Operation

New Plant Solves Disposal Problem—Is Aided by New Collection Regulations

THE city of Lockport, N. Y., for many years disposed of its garbage and rubbish on a city dump not far from the westerly city line. It had been the practice of farmers to come in from the country and collect such garbage as might be used for their pigs. These collections were uncertain and undependable. In response to many complaints by residents against the existing conditions, it was decided to construct a municipal incinerator and to apply for PWA financing. An allotment was secured, with a 23 per cent grant.

EXTERIOR OF THE NEW INCINERATOR AT LOCKPORT, N. Y.

A study of the population, contributing industries and other sources of material which would be delivered to the incinerator showed that an 80-ton incinerator consisting of two 40-ton furnaces would serve satisfactorily. The population is approximately 25,000 persons, and there are a number of industries, such as leather novelty plants, fiber-board plants, cotton-batting plants, and metal-working industries, which contribute industrial wastes.

Site and Building

The incinerator site is in the southwestern section of the city and is easily accessible to the various collection districts by several of the city's principal streets which lead directly to the site. The incinerator is built on a side hill with a half ramp to the charging floor. The ground in the rear of the building is at the same general level as the stoking floor. The building is approximately 30 x 50 feet in plan, with a charging floor of 1,500 square feet. The office and locker room are in a small separate wing. The exterior of the building is of a hard-burned, red, selected common brick which presents a very good appearance, and the inside is of buff Kittanning brick. The roof is of precast Ferro concrete slabs, over which is constructed a twenty-year-guarantee tar and gravel roof.

Incinerator Details

Ground was broken early in May, 1936, and the job was completed November 25, 1936. The chimney is 5 feet in diameter and 100 feet in height above the burning grates. The pre-heaters are of the refractory tile type, equipped with Sturtevant blowers. All material arriving at the plant is weighed on a 20-ton Buffalo truck scale with a recording beam.

The temperature of the combustion chamber and of the forced draft is recorded on a Brown recording pyrometer with a separate thermocouple in each combustion chamber and in the path of the forced draft.

The Decarie furnaces are refractory-lined, with an upper basket grate made of wrought iron pipe through which water is circulated. A steam and water drum with the necessary water connections and blow-off valves is provided with each furnace. There is a steam connection from this drum to the heating boiler in the locker-room portion of the building, so that when the incinerator is in operation it is not necessary to burn coal in the heating boiler to provide warmth in the locker room and office and warm water for the use of the operating personnel.

Aids to Operation

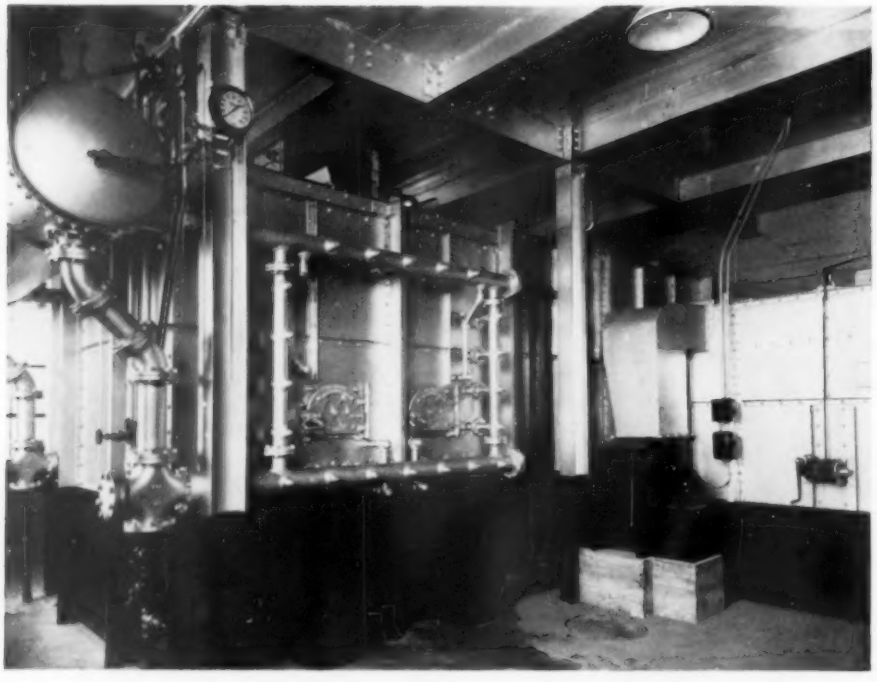
There are a number of features in the plant which are quite helpful from the operators' standpoint. A tin-can chute has been provided, so that tin cans which are separated on the charging floor can be loaded directly into trucks which can drive up to the rear of the incinerator building for their loads.

There are special ash containers which fit under the stoking doors so that ashes can be loaded directly into them from the grates. The ashes from the ash-pit, however, have to be shoveled. The special containers are pushed on wheeled trucks to the outside of the building, where a 1,000-pound hand hoist lifts them from the wheeled trucks and discharges the ashes directly into the motor trucks which take them to the dump. Enough containers are provided so that they can be stored until such time as motor trucks are available.

There is a combination steam and water connection on the charging floor so that the floor and walls can be washed down to keep the plant clean. A locker room for the use of employees has a separate locker for each worker, toilet facilities, a shower, and heat in winter. These facilities assist greatly in securing a better class of workers and in encouraging cleanliness throughout the plant. The locker room is finished in glazed tile and presents a very neat appearance.

Tests and Operations

Operating tests were run on each of the furnaces. The combustion-chamber temperatures during these tests varied from 1200 to 1600 degrees F. and averaged better than 1400. Observations of smoke from the chimney indicated



INTERIOR OF THE LOCKPORT, N. Y., INCINERATOR

only a light blue color with no odor or nuisance, and there has been no complaint from adjacent owners since the plant was started. These burning temperatures are secured without the use of auxiliary fuel. The forced draft was used periodically during the burning period, with a pre-heated air temperature of 350 degrees F. Under these conditions the steam pressure varied from 10 to 15 pounds.

When the plant was put in operation, it was discovered than an unusually large number of tin cans were received with the refuse. On the first run, there were over 1,500 tin cans in 12 tons of material. The per cent of ashes in this test ran 17.8 per cent of the material charged into the furnace. On the second run, a large number of the clean tin cans were sorted out and run directly through the tin-can chute to the trucks without going through the furnace. This resulted in ashes running only 13 per cent. It is now the practice of the operators to pick out the clean tin cans when they have the time and not run them through the furnace, for they get a better fire and fewer ashes to handle.

The operating crew at the plant consists of one stoker, one man on the charging floor, and one working foreman, who, besides working as may be needed in the plant, keeps the records and schedules of the collections so as to maintain a steady flow of material to the plant.

Complete operating records are being kept of deliveries, materials burned, temperatures and the cost of operation, so that the city will know at all times the expense of operation of the incinerator and how that compares with the previous cost of deliveries to the old dump, to which the haul was longer and where a number of men had to be stationed to spread the material and watch out for fires.

Regulation of Collection

Prior to the construction of the incinerator, no particular attention was paid to the methods of collections, the wrapping of garbage, or the activity of scavengers. Since the incinerator was placed in operation, these matters have had more attention than the actual mechanical operation of the plant. To place the collections on as efficient basis as possible, motor trucks are now being used instead of horse-drawn vehicles. An ordinance has been passed requiring the wrapping of garbage, and another ordinance requires that all scavengers secure a permit before they can collect any garbage in the city. A check made in April showed that collections were running from 10 to 14 tons a day and averaging over 12 tons. No auxiliary fuel has been used. Increased collection has come from local manufacturers of leather novelties, wall board and building and roofing paper.

During the first six months of operation, even though the collections have been at a minimum, the investment in the incinerator has proved its worth as a means of disposing of garbage and refuse. Nussbaumer & Clarke, Inc., were engineers for this project. The contract for the plant was awarded to the Decarie Incinerator Corporation, New York City, on its low bid of $51,800. The 100-foot chimney was built by the Kellogg Company. The plant, as well as the collection service, is operated under the direction of Leon H. Wendel, Superintendent of Public Works.

Malaria Spread by Trailer Travelers

Persons traveling in trailers often do not realize the necessity of avoiding camping near malaria-infested sites. Increased travel between different parts of this country has increased the danger from malaria, and the auto trailer may be an important factor in carrying it into regions where the disease would not otherwise occur. Northern people going to southern states may park their trailers near mosquito-breeding water and be bitten by mosquitoes which have previously bitten persons suffering from malaria. These travelers may come down with the disease, not immediately, but later when they have returned home or have passed on to a non-malarious region where Anopheles mosquitoes are present. Then, when bitten while ill, these patients may infect the local mosquitoes, and these mosquitoes may pass it on to the local population, where it may soon appear even in epidemic proportions. Already there have been spasmodic outbreaks of malaria on the outskirts of northern cities possibly due to trailer carriers. The danger must be recognized, and all communities should insist on the provision of safe camping grounds for these travelers.

Henry E. Meleney, M.D.,
Vanderbilt University School of Medicine.

Municipal Street Cleaning

A Study of Methods and Costs, Problems and Solutions

By FRANK J. McDEVITT
Director of Streets and Sewers, St. Louis, Mo.

MOST municipalities are faced with a serious financial problem. In emerging from the depression with depleted finances, it is difficult to provide funds for various services and at the same time show a balanced budget. On one hand, the taxpayers are clamoring for the better performance of various civic functions, and, on the other hand, bankers, merchants, and business men are emphasizing economy in order to maintain security values. The answer is to find some happy medium whereby the best service can be obtained at a minimum of expense. It is difficult to formulate any specified method of procedure, since every municipality has local conditions which will affect the problem and which must be taken into consideration in arriving at a proper solution.

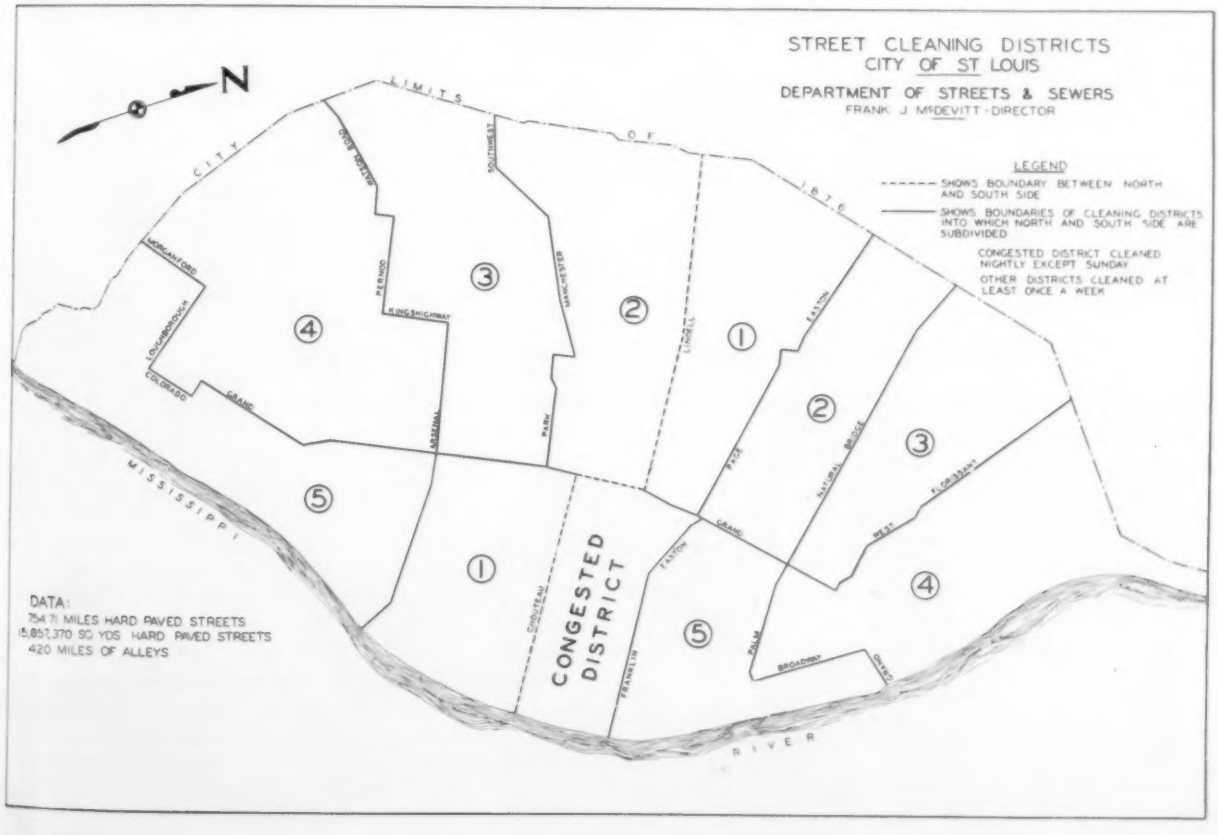
Of all civic functions, none is more important than street cleaning, and funds for this purpose can easily be wasted unless proper foresight is used. Back in 1925 St. Louis had a street-cleaning budget of $700,000 with 525 employees on the payroll. During the succeeding eight years some economies were made, reducing the budget by $100,000 and the payroll by 100 men. The big slash came in 1932 and 1933 when the budget was cut to $280,000, and the payroll to 225 men. This saving was accomplished largely through the elimination of a private contract and the old-time "white wings" with hand push-carts. As many of these employees went on relief rolls, it is questionable whether the change was worth while.

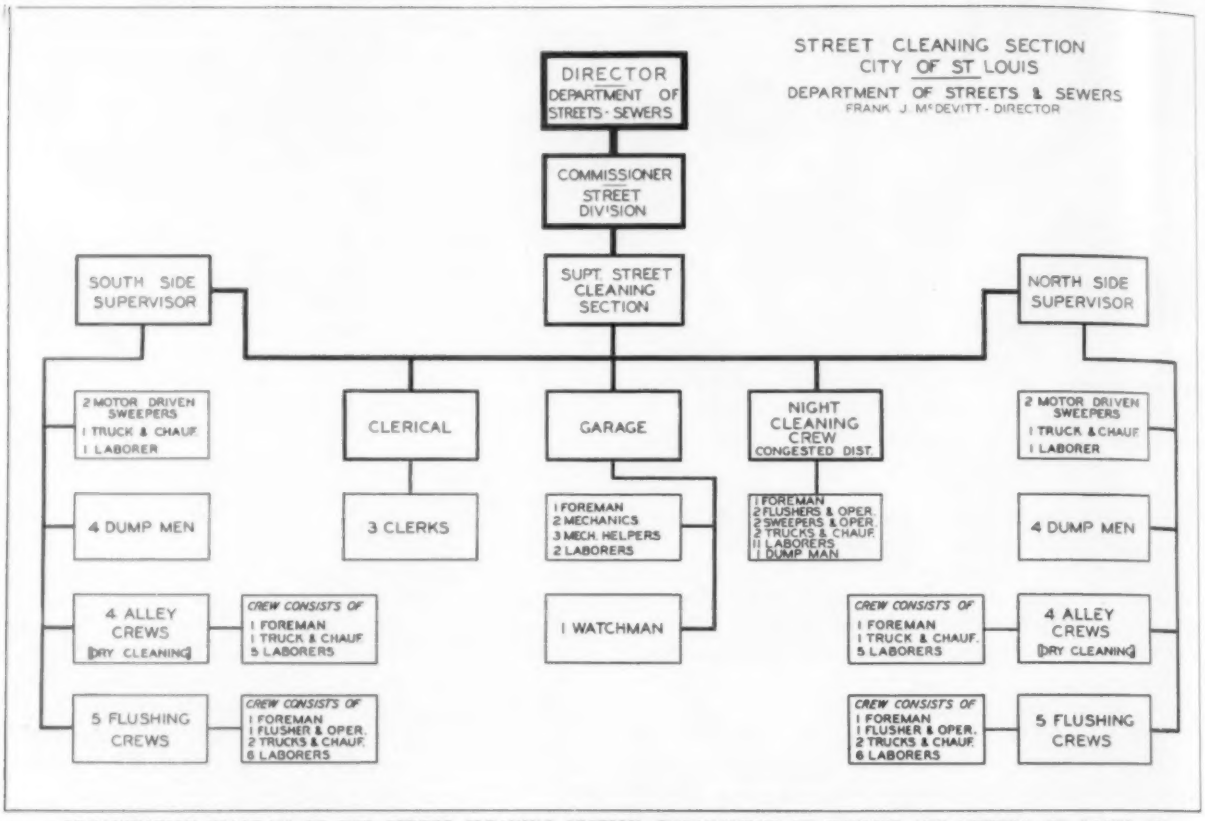
Organization and Equipment

At present the city is divided into three sections—the north and south sides, and the congested business district. The former are each subdivided into five districts, with a cleaning crew in charge of each section, which is cleaned once each week during the daytime. The business district is cleaned each night. The attached charts show the organization arrangement, and a map of the cleaning districts.

The equipment used consists of 12 motor-driven flushers of the tractor-trailer type, of 2,000-gallon capacity. Also 6 motor-operated pick-up sweepers, and 41 dump-trucks of 1½-ton capacity. Two flushers and one sweeper are held in reserve for emergencies.

There are 754 miles, or 15,860,000 square yards, of hard-paved streets and about 420 miles of alleys to be cleaned. Dumps are available throughout the city for the disposal


STREET CLEANING DISTRICTS
CITY OF ST LOUIS
DEPARTMENT OF STREETS & SEWERS
FRANK J. McDEVITT - DIRECTOR
LEGEND
SHOWS BOUNDARY BETWEEN NORTH AND SOUTH SIDE
SHOWS BOUNDARIES OF CLEANING DISTRICTS INTO WHICH NORTH AND SOUTH SIDE ARE SUBDIVIDED
CONGESTED DISTRICT CLEANED NIGHTLY EXCEPT SUNDAY
OTHER DISTRICTS CLEANED AT LEAST ONCE A WEEK
N
CITY LIMITS
CONGESTED DISTRICT
MISSISSIPPI RIVER
DATA:
754.71 MILES HARD PAVED STREETS
15,857,370 SQ YDS HARD PAVED STREETS
420 MILES OF ALLEYS



ORGANIZATION DIAGRAM OF THE STREET CLEANING SECTION, DEPARTMENT OF STREETS AND SEWERS, ST. LOUIS, MO.

of refuse. The city maintains a trap-boat and dump-barge where sweepings from the business district are loaded and hauled down the Mississippi River for disposal at specified locations approved by Army Engineers. Refuse cans designed and constructed by the Department of Streets and Sewers are maintained on the principal street corners throughout the city and are emptied at regular intervals into dump-trucks assigned for this purpose.

The garage where the street-cleaning equipment is stored and kept in repair is commodious and of adequate proportions. A force of competent mechanics looks after maintenance, and three clerks take care of records and complaints.

The Parked-Car Problem

Parked cars present one of the major problems in street cleaning. On several occasions efforts were made to secure passage of an ordinance forbidding parked cars between 2:00 A.M. and 4:00 A.M. in all parts of the city. All-night parking is an abuse which has developed during the depression. Unless some measures can be provided to remedy this condition, it will be a difficult job to keep the gutters clean with sweepers. Flushers can be used to much better advantage, although suitable provision must be made to prevent refuse from being washed into sewer inlets.

Other Problems

Another abuse consists of sweeping refuse from stores and office buildings into the gutters. This practice is quite noticeable in the main business district. City forces clean this district every night, and it is very discouraging to have the gutters littered with refuse shortly after. Still another source of trouble comes from wrapping paper, excelsior, and other débris left in alleys at the rear of stores. It is often scattered by the wind before the cleaning crew puts in an appearance. This could be avoided by using containers.

Many excavating contractors hauling dirt from the building site to dumps frequently cause trouble on the streets by spilling due to overloading. During the summer months this material is dry, and if dropped in the streets it rapidly becomes pulverized by traffic. The dust created is often blown through open windows of homes, causing many complaints from the residents. During the fall and winter months when the dirt is damp, it compacts on the streets and is very difficult to remove. The compacted lumps of dirt and stones cause injury to the paving from the constant pounding of traffic. Efforts have been made to secure the cooperation of contractors to prevent the overloading of trucks, but the results have not been entirely satisfactory.

At prominent street intersections where there are newsstands, unsightly conditions exist through carelessness on the part of newspaper delivery trucks which scatter wrapping paper and heavy twine in the gutters.

During the fall a heavy burden is carried by the street-cleaning crews in keeping the streets free from fallen leaves. Quite frequently in the residential quarters just after a street has been cleaned, gardeners, instead of raking leaves off the lawn and burning them, will take a hose and wash the leaves into the gutter.

Winter's Contributions

While St. Louis winters are not severe, the streets are often in a hazardous condition from ice. In the interest of public safety, a liberal supply of cinders and torpedo gravel is sprinkled where needed. It is difficult with reduced forces to clean up before the spring rains start, and as a result much of this material is washed into sewer inlets and sewers. During the spring of 1936 one of the main sewers became badly clogged in this manner and it took a crew of men with a hoist and two trucks nearly a month to remove the accumulation.

Snow is not a serious problem. There are usually about four or five storms averaging four to six inches. While the street-cleaning crews are insufficient, no extra help or additional trucks are employed. Employees from the bridge and paving sections are drafted, and about 25 trucks equipped with modern snow-plows keep the main thoroughfares in good condition for traffic. Parked cars are also a decided hindrance to snow removal, and sooner or later some drastic action will have to be taken, especially with regard to all-night parking. St. Louis is well equipped with garages and parking lots, and rentals are not excessive, so there is no reason why these facilities should not be used.

Relief and Wages

With the Federal Government and the states contributing to relief, and with the realization that notwithstanding improved business conditions the relief problem will likely be with us for some years to come, it may be well to consider the possibility of utilizing some of the city relief money for work relief. If able persons on the relief rolls could be put to work for a few days each week on street cleaning, the extra hand labor would help to solve the present problem of cleaning streets around parked cars. Where this is done, the relief money so spent should be kept separate from the street-cleaning budget.

With improved business conditions, it is noticeable that many competent street-cleaning foremen are leaving the city employ to secure better-paid positions in industry. After all, whether or not a group of men are performing satisfactory work depends largely on the class of supervision furnished, and if better results are to be obtained through competent supervision, municipalities will have to pay their foremen wages commensurate with those paid by industry. If this were done, the increase to the budget would be negligible, and unit costs should be reduced through better supervision.

Cooperation Cuts Costs

It is likely that the difficulties in operating with a reduced force which have just been enumerated are in a measure common to other municipalities. Streets and alleys can be kept in a state of cleanliness, notwithstanding a reduced budget, provided janitors, yardmen, newspaper circulation trucks, and owners of parked cars will all exercise care and extend proper cooperation. It will be necessary to enact suitable ordinances to correct these conditions, and above all to see that the ordinances are properly enforced.

Operating costs for street and alley cleaning, which include maintenance of equipment together with labor and material entering into pick-up and disposal, but omitting fixed charges and overhead, are as follows:

Cost per curb-mile for day operation with motor sweeper	$2.08
Cost per curb-mile for night operation with motor sweeper	1.91
Cost per mile of streets with day operation of flusher	1.9.

The cost of flushing is not entirely correct, since it is calculated by dividing the total cost by the miles traveled. On wide thoroughfares it is necessary to make two or more trips, which in turn causes a certain amount of inactive back travel or dead mileage. By excluding this item, the flushing cost on wide thoroughfares would average about $2.32 per mile.

The business district is cleaned each night by the combined use of flushers and sweepers. The latter are used first to sweep the area between the lanes occupied by parked cars, and are followed immediately by the flushers, which clean the parking lanes. Pick-up crews then collect the débris along the curbs, and haul it away to the river barge. This combination costs about $2.25 per curb-mile.

These unit costs would indicate that motor-operated sweepers are to be preferred over other methods of cleaning streets. Because of parked cars these costs are misleading. A recent check in the residential section covering night operation indicated that only about 40 per cent of the gutters could be cleaned, owing to parked cars. Next day when the cars are moved, dirty spots prevail in each block, and the average citizen figures that the street-cleaning crew is careless and getting poor results. While sweeper costs are less, numerous complaints indicate that results obtained are unsatisfactory, due chiefly to parked cars making the area adjoining curbs inaccessible.

Under these conditions, it would seem that better results can be obtained with flushers of a smaller type, operating with higher water pressure so as to clean wide thoroughfares with one trip, thereby avoiding back travel.

Another suggestion which is worthy of consideration, in the interest of economy, is to place outage meters on each piece of equipment. These meters should be equipped with a 24-hour chart showing the exact number of hours useful work is being performed by the operator, and a blank face on the instrument will prevent anyone except those in charge of the check from knowing what is taking place.

A Novel Suggestion

The marking of street center lines to keep traffic moving properly is an expensive matter. Reduced costs can be obtained with a paint truck, but the lines have to be replaced at least once a year, and oftener on heavily traveled thoroughfares. This expense has been reduced in some instances by the use of special tape, concrete inserts, and metal markers. An idea that is being given consideration in St. Louis is to combine street marking with cleaning. By deforming 4-inch pipe into a square section and welding nozzles every 4 feet, it would be possible, by using stainless-steel tops on the nozzles, which would be located along the street center line, to use them as traffic dividers. When necessary to clean the street, a crew with pick-up trucks could connect the center line distributing pipe to an adjacent fire-plug, and the sprays emanating from the traffic markers would wash all refuse to the curbs

where it could be loaded on pick-up trucks. Each city block on major streets would be equipped with such a pipe line down the street center line, having combined traffic markers and stainless-steel flushing nozzles attached. One end should be arranged for a temporary hose connection to a nearby fire plug and the other end provided with a syphon connection for draining to the sewer inlet after use. Whether or not this idea will work satisfactorily depends on city water pressure and street widths. There certainly would not be the objection to daytime operation of flushers splashing automobiles, for the streets would be covered with a thin film of water providing a maximum cleaning effect and a minimum of splashing. Experimentation will determine whether or not there is anything to this idea.

Each municipality, because of local conditions, must solve its own street-cleaning problems. It is to be hoped that some of the suggestions made will be of assistance. One thing is certain. Taxpayers have not forgotten the depression, and they expect each tax dollar to produce the maximum results. With this in mind, every effort should be made to inaugurate worth-while economies.

London's Kingsway Improvement

Financial Results of an Outstanding Example of the Exercise of Excess Condemnation in Connection with a Great Thoroughfare Development

IN a report presented on December 15, 1936, to the London County Council by its Highway Committee, the following account is given of the results of excess condemnation in the financing of the world-famous Kingsway improvement, sanctioned in 1899—the Holborn-Strand development which created the great thoroughfares of Kingsway and Aldwyck out of a mass of mean streets and slums which formerly stood on the site:

"The scheme provided for the construction of new thoroughfares 100 feet wide, having a total length of approximately three-quarters of a mile. More than 600 properties, covering an area of approximately 28 acres, were acquired for the improvement and demolished. The area of the land dedicated to public streets was about 12¼ acres, leaving about 15¾ acres of surplus lands to be dealt with for recoupment purposes. The properties acquired included 51 public-houses and beer-houses, the licenses of which the Council decided, in January, 1901, to abandon.

"The letting on building lease of the surplus lands of the improvement began in 1903, and, whilst it took several years to establish the confidence of building lessees in the value of the position from the building point of view, the letting of the sites proceeded steadily during the ensuing decade, especially in Kingsway, the development of which was practically completed, together with a considerable part of the land in Aldwych, before August, 1914.

"The sites near the Strand, having higher ground rental values, were the last to be dealt with, and conditions during the years 1914 to 1918 undoubtedly had the effect of restricting building operations, whilst the difficulties of financing building schemes experienced during most of the period since 1918 delayed the completion of the redevelopment of the surplus lands at the southern end of the improvement. It was not until 1930, that the last of the vacant sites with a frontage to the Strand was let on building lease to complete the original conception of the Bush House group of buildings.

"The Council receives about £143,000 annually in ground rents from the surplus lands of the improvement, upon which buildings of the approximate cost of £5,000,000 have been erected. In addition, a sum of £966 a year is received in respect of betterment charges. A total sum of £735,507 has been received from the sale of sites, and other sites valued at £225,191 were transferred in settlement of claims on a reinstatement basis.

"The total debt charges incurred to 31st March, 1936 (£5,209,563), plus the net debt outstanding at that date (£3,208,607), amounted to £8,418,170. Against this the aggregate rents received, plus the value of the leased sites, amounted to £6,009,931. The differences (£2,408,239) may therefore be said to represent the net cost to the ratepayer up to 31st March, 1936.

"The annual net charges on the rates (that is, the total debt charges less the rents and improvement charges), which in 1935-36 amounted to £60,752, will be reduced as loan charges fall out. In the year 1955-56, it is anticipated that there will be a small surplus of £2,000. This and ensuing surpluses will be a credit to rate account year by year. A large part of the debt will become extinguished in 1961-62, so that the total debt charges in that year will decrease by about £114,177. In 1965-66, the surplus for the year is estimated at £143,725, increasing later to £146,000, the debt being finally paid off in 1987-88. The properties will thereafter be an unencumbered asset, so far as existing debt is concerned. The cost to the ratepayer of the improvement would have been less but for the delay occasioned by the war.

"The present accumulated charge on the rates is £2,840,676, and this will increase to over £3,500,000; after which the annual surpluses should gradually extinguish the accumulated deficit. This process should be completed in 1986, by which date the aggregate result will be a credit. Thereafter the revenue from the unencumbered asset should add annually to the surplus.

"The forecasts of the position subsequent to 1936 are necessarily tentative and are given under reserve for the purpose of illustrating the trend of the finance of the improvement. They do not allow for interest on deficits, and they assume that rents and improvement charges will remain at their present level, and they do not take into account changes which may take place when the existing leases expire.

"Taking the figures as they stand, they show that a considerable charge has been and will continue to be imposed annually upon two generations of ratepayers for the ultimate financial benefit of their successors, but that this benefit will not commence to accrue until twenty years' time from now. If interest on deficits were allowed for, there would always be an annual deficit, unless the rents ultimately greatly exceeded £146,000.

"This report deals only with the financial aspect of the improvement, but, in assessing its value to the community, regard must also be had to the great increases in ratable value and in the value of property which have accrued and to the advantages to traffic from the improvement."

The Control of Manhole Explosions

By MERTON HENRY

IN considering manhole explosions it would be of great interest to know how many explosions occur and the extent of personal injury and property damage. However interesting such information might be, it is not available. There is not even a complete record for a single city, though materials for it may exist in the files of local utilities and the municipal authorities. Nevertheless, we need not remain wholly in the dark, for a rough idea of explosion frequency and effects (in any particular city) may be gained from newspaper files.

Going as far back as 1913, the first manhole explosions of news importance occurred in 1914 in two sewer manholes in midtown New York. Since 1919 there have been 17 persons injured in 8 sewer explosions, and 1 killed and 29 injured in 46 electric manhole explosions, distributed as shown in the following table:

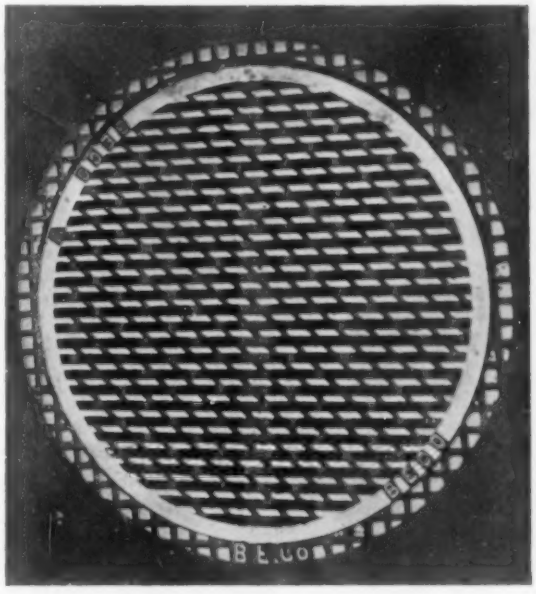
Year	Sewer Explosions	Persons Injured	Elec. MH Explosions	Killed	Persons Injured
1920	0	0	4	0	1
1921	0	0	3	1	0
1922	2	1	3	0	7
1923	1	5	4	0	2
1924	1	0	1	0	2
1925	0	0	6	0	2
1926	1	11	1	0	0
1927	0	0	2	0	2
1928	1	0	0	0	0
1929	0	0	4	0	2
1930	0	0	2	0	0
1931	0	0	1	0	0
1932	0	0	1	0	0
1933	0	0	3	0	3
1934	0	0	1	0	0
1935	1	0	8	[illegible]	
1936	1	0	2	0	0
TOTAL	8	17	46	1	29

However, the most terrific manhole explosions in the Northeast, and probably in the entire country, occurred outside of New York City. One of these was in Newburgh, N. Y., in 1929. In this series of communicating explosions, one person was killed, eighty were injured, and about twenty buildings were wrecked or burned. The damage was said to have been $250,000. The other was in Bayonne, N. J., a few months later. Seventy-five covers were blown up and 5,000 people were driven from the area by the fumes. As many persons were injured in the one explosion in Newburgh as were injured in all the explosions in New York City during the last twenty years.

Investigations

Frequent investigations of manhole explosions have been made, and the reduction of hazard in them has been given considerable study. The investigations and study have had, generally, one of two objects—either the reduction of hazard by preventing explosions, or the reduction of hazard by rendering harmless such explosions as do occur.

During the five-year investigation in Boston the atmosphere of thousands of electric manholes was tested for combustibles on the spot with a gas detector, and many samples were taken for laboratory analysis. Out of this investigation came the idea for an excellent portable gas detector and a practical procedure for patrolling a manhole system permanently, making routine tests of the air in every manhole passed (see F. M. Goodwin's "Outline and Procedure and Systematic Testing of Street Manholes," *New England Gas News*, Vol. 7, No. 6, June, 1932). The idea is to discover and get rid of explosive gases before they are set off by a chance match, cigarette, or other spark.



A MANHOLE COVER THAT IS SAFE IN EXPLOSIONS

A cover like this one of cast steel, weighing 450 pounds and having over 50 per cent of its area in ventilating slots, will not fly during the most violent manhole explosions

The gas-detecting patrol is effective against gasoline wastes, sewer gas, and leaking illuminating gas and consequently is adequate for the prevention of sewer explosions. But it is not effective against the other cause of numerous explosions; that is, explosive gas generated almost instantaneously during cable failures from the burning or distillation of any of the common insulating materials—impregnated paper, varnished cambric, or rubber.* Manufacturers and public utilities have reduced cable failures by taking great care in the manufacture, handling, loading with current, and joining of cables, but they have by no means eliminated them. Utilities and manufacturers are to be commended for the work they are doing along these lines, but it is not humanly possible to keep one or another of the 31 causes of cable failure from slipping by here and there. Nor is there any likelihood that the new non-inflammable cable insulation can replace that now in use before several decades, if ever. Consequently, as manhole explosions do continue to occ[illegible]

*WING, D. O.: "Some Causes of Sewer and Manhole Explosions," *Gas World*, Vol. 99, No. 2566, October 7, 1933.

"Cause and Prevention of Manhole Explosions," *Electrical West*, Vol. 68, May 15, 1932, p. 467.

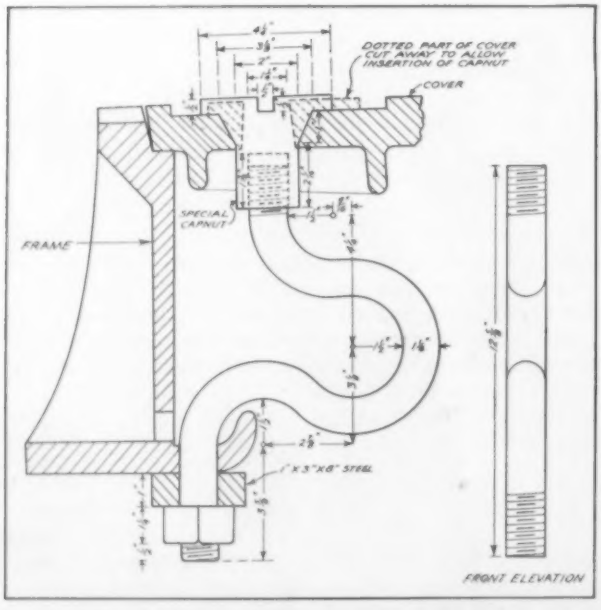
"Manhole and Sewer Explosions," *National Fire Protection Association Quarterly*, Vol. 23, No. 4, April, 1930, pp. 402-426.

despite all reasonable care, other investigators have undertaken to render these explosions harmless.

Preventing Damage

Hazard in manhole explosions results from the fumes, the flash, the concussion, and flying covers or parts of covers, which have been known to land on roofs or travel as far as 225 feet from the manhole. It does not appear likely that the fumes will ever be generated in such quantities that they may not easily be escaped by anyone in the street. No practical way of confining the flash is known, but fortunately it does not extend beyond a relatively small area around the manhole. The concussion, which causes falls, nervous shock, broken windows, and cuts from flying glass, may be greatly reduced, and the flight of covers may be virtually eliminated by simple changes in the design of new covers or by simple modification of the existing ones.

A successful alteration or modification would have to be, first, thoroughly effective; second, cheap in first cost; and, third, cheap in subsequent operating cost. The first requirement may be readily met by one or a combination of such modifications as bolting the cover to the frame with one or more bolts; attaching the cover to the frame with a bolt or bolts engaging helical or semi-elliptic springs, hydraulic shock absorbers, or compressed-air shock absorbers in compression; attaching the cover to the frame with a hinge, with or without springs; or attaching the cover to the frame with a spring in tension. The first requirement may be met also by increased weight of covers, reduced area, providing lugs to be engaged in recesses in the frame, or increasing the total area of the vent holes to about half of the area of the cover. The difficulty is to find a device which is both cheap and easy to operate. The chief defect of most of the ideas which have been proposed, or tested and patented, is that they require the installation of all-new equipment, ignoring the millions of dollars of serviceable covers already in use.



THE SINGLE CURVED BOLT WHICH PROVED MOST EFFECTIVE FOR ATTACHING EXISTING COVERS TO PREVENT FLYING

To overcome this defect, various devices which can be attached to existing covers, as well as simple changes in the design of covers, were tested in over a hundred manhole explosions produced artificially in New York City in 1935. The test manhole was a 12-foot length of 4-foot cast-iron pipe set on end in the ground, and covered with a concrete slab 2 feet thick by 8 feet square in which the cover and frame were set. Manufactured gas was used up to the limit of its explosive force (18 per cent gas and 82 per cent air mixture), which is likely to give as violent an explosion as any occurring accidentally in the street.

Recording of pressures developed during some of the manhole tests showed that, with an ordinary manhole cover with standard cast-iron inner cover bolted with standard crossbar and screwbolt, the cover was blown off by a pressure of 22 pounds per square inch with a mixture of 12 per cent gas and 88 per cent air. When 18 per cent gas and 82 per cent air were used, a pressure of about 28 pounds per square inch was developed; and when the resistance was increased by attaching the cover to the frame with a helical spring under compression, the pressure developed was about 45 pounds per square inch. This was the highest pressure recorded during the tests.

Thus it would appear that the principle to be applied in the control of manhole covers during explosions is a reduction of the resistance to the escape of the expanding gases. In addition, the reduction of resistance lessens the concussion so that, using the best cover design, the explosion is a puff rather than a detonation.

Out of all the chain, bolt, and spring contrivances tried, the most satisfactory for attachment to existing covers was a single curved bolt on one side of the cover. If no inner lip exists on the frame to which the bolt is to be attached, a lug may be formed by setting a ¾ x 3 x 9-inch steel plate under the flange of the frame, with about 2 inches projecting. A hole can be bored in the projecting part for the bolt. When a single bolt was used with 18 per cent gas, the free side of the cover opened like a flap and fell back practically on its seat when the pressure was released. The bolt was left partly straightened out. Out of eight trials, with and without a light sheet-metal inner cover, only one bolt broke. Out of three trials with a shorter curved bolt, two broke. When a standard cast-iron inner cover, locked down with a standard crossbar, was used with a single curved bolt in the outer cover, the outer cover was torn over the head of the bolt, and parts of the inner cover were projected 230 feet from the manhole.

One trial was made with two curved bolts, one on each side of the cover opposite each other. The cover rose 4 inches, leaving the bolts partly straightened out. When a cast-iron inner cover was added to this combination, the outer cover broke in two, one half rising 5 feet and landing 15 feet from the manhole while the other half remained on the seat. Parts of the inner cover landed 150 feet from the manhole.

Four curved bolts spaced equidistant around the outer edge of the cover allowed it to rise 2 inches when the cast-iron inner cover was not locked down. The pieces of the broken inner cover dropped into the manhole. When the inner cover was locked down, the outer cover rose 4 inches.

and a few small pieces of the inner cover landed about 15 feet from the manhole.

A standard cover, not bolted and without inner cover, rose 8 feet in explosions of 18 per cent gas. A standard outer cover with a standard cast-iron inner cover bolted down with a crossbar and screwbolt, as is the regular practice in New York and other cities, rose 22 feet in explosions of 18 per cent gas, and parts of the inner cover were blown 150 feet from the manhole. The vent area of these outer covers is 4 per cent. A light experimental cover in the form of a grating with about 50 per cent of its area in vent slots rose from 1 to 3 feet.

There is little doubt that a cast-steel cover, such as is shown in the photograph, weighing about 450 pounds and having over 40 per cent of its area in vent slots, will not rise from its seat even during explosions of 18 per cent gas. Hundreds of covers of this type, in both round and square shapes, are in permanent use in New York City on transformer manholes, using a heavy wire grating for an inner cover. What the behavior of these covers would be with a cast-iron inner cover is doubtful. A cast-iron inner cover alone will not blow off the manhole even in explosions of 18 per cent gas. In mild street explosions the inner cover confines the flash. However, in mild street explosions the flash is small.

Summary

From the tests and a survey of available literature it would appear that manhole explosions may best be controlled by, first, instituting thorough preventive measures on both sewer and electric manholes; second, substituting flexible sheet-metal or wire grating inner covers for rigid cast-iron ones, or eliminating the inner cover entirely; third, using covers with 40 to 50 per cent ventilating area on all new installations and on all replacements of worn-out old-type covers; and, last, in those few places where it is considered to be necessary, controlling existing covers with a single curved bolt.

Thirteen Thousand Babies Need Not Die!

Planning for Peace and Health

By NORMAN MACFADYEN, D.P.H.

THE English Garden Cities of Letchworth, Welwyn and Wythenshawe are demonstrating that peaceful and healthful surroundings can be evaluated in terms of vital statistics. An average of the last five years shows 600,000 births per year in England and Wales. Of these, 62 out of every 1,000 die. Now, supposing we can show, as I think we can, that instead of the infant mortality being 62, it ought to be 40. That means that we could save 13,000 lives a year, an achievement over which there is bound to be increasing political concern.

	General Mortality	Infant Mortality
Letchworth	8	33.6
Welwyn	5.9	25
Manchester City	12.85	71
Manchester City (clearance areas)	17.32	120
Wythenshawe	7.86	60
England and Wales	12	62

If you study these figures, you will see that a death rate of 8 and an infant mortality of 30 for Garden City development is a reasonable hope. This compares with 12 and 62 for England and Wales.

Let us take some death-rate figures, again from Manchester:

	Measles	Influenza	Bronchitis	Pneumonia
Clearance areas	.35	.41	1.56	2.21
Wythenshawe ..	.05	.25	.11	.61

You will see from this how much greater chance of survival a person has if he has bronchitis or pneumonia at Wythenshawe compared with one of the clearance areas of Manchester.

Letchworth figures show that the days lost through illness per person are just over two per annum, whereas they are more than four in neighboring towns, and just under four for the whole of England and Wales. We can, then, claim that the incidence of disease is less under Letchworth conditions, that the virulence of disease is less, and that the chance of a fatal termination is much less.

Now let us turn back and deal with tuberculosis. There is no disease which is more dependent on environment, nor is it one which can be conquered, so widespread is it, except by general methods such as good housing, good food and, indeed, good living conditions. Here, again, are five-year averages:

Manchester City	1.04
Manchester City (clearance areas)	1.97
Wythenshawe	.72
Herts County	.46
Letchworth	.38
England and Wales	.76

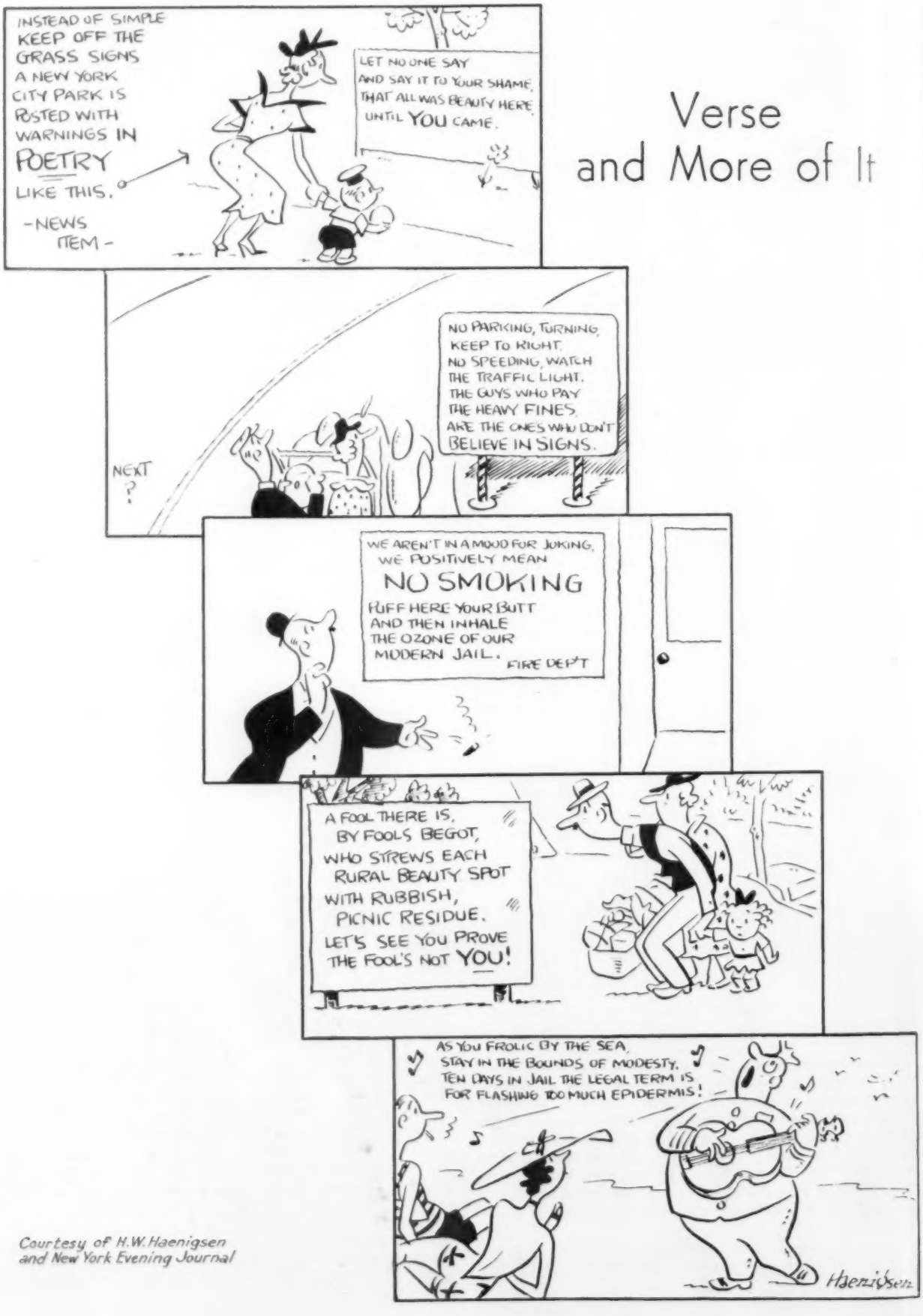
You will see from this that the Letchworth death rate is one-third that of Manchester.

Now let us come to the birth rate. Facts show that if there is no rise in the birth rate we shall have a stationary population by the year 1941, and after that it will decline rapidly. In this complicated question we must get back to first principles, and to the fact that the provision of a healthy, happy home is fundamental. The method of warehousing people in flats is the direct negation of the policy needed. It makes family life difficult, and in some cases impossible. Deep down in nature is the desire to preserve the race by family life lived in proper social relationship and in natural conditions, and we must rely upon this and give opportunity for it. Government departments work in watertight compartments very often, but we know that sectionalism is not enough, and in this great task of race building, which will shortly become so important, a unified policy becomes a necessity, and the sooner this is done the better. There is no doubt that our Garden City policy contains the germ of what is necessary, and we are, in view of the urgent need of today, entitled to ask that all sections of the government shall combine to make our policy possible. And this because of the birth rate alone. The present policy of flat-building is materialistic in conception and denies life its opportunity. The general birth rate today is 15; that of Welwyn 19, and of Letchworth just about 15.

We shall be on firm ground if we learn from nature herself in this matter, and give people conditions to live in which promise security and inspire them with a love of their country.

—From *Town and Country Planning*, London, England.

Verse and More of It


INSTEAD OF SIMPLE KEEP OFF THE GRASS SIGNS A NEW YORK CITY PARK IS POSTED WITH WARNINGS IN POETRY LIKE THIS.
-NEWS ITEM-
LET NO ONE SAY AND SAY IT TO YOUR SHAME, THAT ALL WAS BEAUTY HERE UNTIL YOU CAME.
NEXT ?
NO PARKING, TURNING, KEEP TO RIGHT. NO SPEEDING, WATCH THE TRAFFIC LIGHT. THE GUYS WHO PAY THE HEAVY FINES, ARE THE ONES WHO DON'T BELIEVE IN SIGNS.
WE AREN'T IN A MOOD FOR JOKING, WE POSITIVELY MEAN NO SMOKING PUFF HERE YOUR BUTT AND THEN INHALE THE OZONE OF OUR MODERN JAIL. FIRE DEP'T
A FOOL THERE IS, BY FOOLS BEGOT, WHO STREWS EACH RURAL BEAUTY SPOT WITH RUBBISH, PICNIC RESIDUE. LET'S SEE YOU PROVE THE FOOL'S NOT YOU!
AS YOU FROLIC BY THE SEA, STAY IN THE BOUNDS OF MODESTY. TEN DAYS IN JAIL THE LEGAL TERM IS FOR FLASHING TOO MUCH EPIDERMIS!
Haenigsen

Courtesy of H.W. Haenigsen and New York Evening Journal

750-Gallon Quads Replace Louisville's Museum Pieces

Modern Policy on All Apparatus, Fire Alarm and Prevention

By EDWARD A. McHUGH
Chief, Division of Fire, Department of Public Safety, Louisville, Ky.

MAYOR NEVILLE MILLER of Louisville, upon induction into office, had a complete survey made of all phases of city government. The results were comprehensive plans and definite courses of action to obtain increased efficiency and economy of operation on a year-by-year progressive basis. The Department of Public Safety came in for its full share of improvements, and this is the story of the Division of Fire's part in the program during the last two years.

Coming out of the depression with considerable worn-out and obsolete equipment, the Division found that prompt and adequate improvements were imperative. In this, standardization was aimed at in regard to the rebuilding of apparatus and the selection of cars and apparatus for replacements.

Policy—Apparatus Not Over 15 Years Old

The 750-gallon quad type of apparatus was developed to replace obsolete truck-company equipment and to mesh with engine-company requirements in residential and light-mercantile areas. This type has compactness, sleek lines and all-around general utility. Quad companies carry a crew of 16 men (8 on and 8 off), 195 feet of ladders from 12-foot to 50-foot, life-net, 1½-, 2½-, and 3-inch hose, and a demountable turret pipe. On box alarms, one of these quad companies responds with two adjacent engine companies and battalion chief. Reporting in on multiple alarms, they are a real help and instantly available for truck or engine service, as may be required. For outlying residential areas a quad and one engine company suffice for the still alarm.

The present apparatus is listed below:

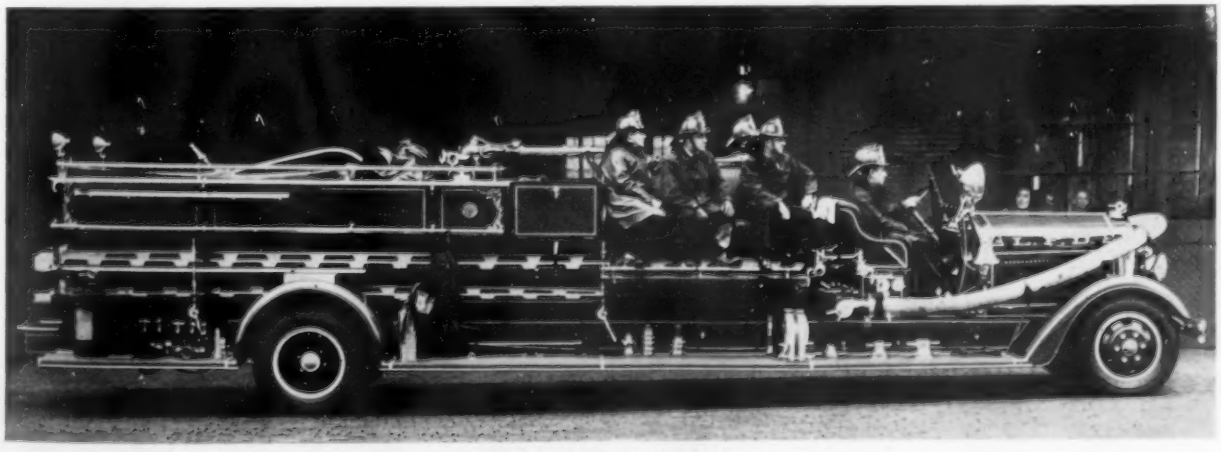
Pumping engines—13 Seagraves, 8 Ahrens-Fox, 4 American-LaFrance, ranging from 500 to 1,400 gpm, but mostly about 900 gpm.
Trucks—1 Mack, 2 American-LaFrance aerials and 1 city service, 3 Seagrave city service.
Quadruples—2 Ahrens-Fox 750-gpm, 3 American-LaFrance 750-gpm.

The age of apparatus runs from several months to 21 years. We shall try to keep the maximum at 15 years. The schedule of replacement calls for quadruples in Truck Companies 5, 6, 7 and 8, and the junking of one aerial truck, three city service trucks, and two hose trucks. Engine 13, thought to be twenty years old, has been completely rebuilt and will be placed in reserve along with five other engines averaging fifteen years.

Our most recent additions consist of two American-LaFrance 750-gallon pumpers and one Ahrens-Fox delivered in 1935; and three American-LaFrance 750-gallon quads received this year.

The miscellaneous equipment includes MSA All Service gas masks (Burrell type) with speaking diaphragms, and McCaa two-hour oxygen breathing apparatus, made by Mine Safety Appliances Co.; five Grant Multiversal nozzles; three Homelite generators, which proved invaluable during the flood emergency when all current was off for a few days.

We have 351 men, compared with 320 in 1933, in 26 companies in 22 fire houses, and a new headquarters building.



ONE OF LOUISVILLE'S NEW QUADS

When this apparatus is stationed in front of a burning building, the booster tank and small hose can be used, and the ladders are readily available. With 30 pounds pressure, 100 feet of hose from the hydrant to the suction of the pump will permit one 1¼-inch stream to be used, and by laying a second line the full capacity of the engine will be available. Note the effort that has been made to safeguard the life of the crew by placing side seats on the truck

Hose, Moisture- and Mildew-Repellant

We have in service 67,500 feet of numerous brands of hose made by Goodyear, Goodrich, U. S. Rubber, Hamilton Rubber, Cincinnati Rubber, Hewitt Rubber, Republic Rubber, Quaker City Rubber, Boston Woven, and Fabric Fire Hose. Except for 1-inch chemical hose and 5-inch hard-suction hose, all of it is 1½, 2½-, 3-, 3½- and 4-inch double-jacket cotton rubber-lined fire hose. Replacements average 15,000 feet per year.

We have been purchasing hose for the last two years on specifications that approximate Underwriters specification hose, with the addition that it must be wax- and gum-treated or otherwise made moisture- and mildew-repellant. This grade has been regularly bought on competitive bids. We furnish our own couplings to be attached by the successful bidder.

Fire-Alarm System Dependable

The fire-alarm telegraph system is often referred to as the mainspring of the works of a fire department. Louisville uses Gamewell equipment, operated from a central office on a manual basis, with two operators on duty at all times. The Ohio Valley flood disaster completely shot our telegraph system, and necessitates an expenditure of $150,000 or more to replace underground cable and boxes. However, our fire-alarm office never failed, but carried on partly by telephone, partly by portable phones plugged into box circuits, and partly by short- and long-wave radio. At one time the office operated for 4½ days continuously on the double storage-battery sets when all current was off.

We have 550 street boxes, 45 private institutional boxes, and some 254 plants and buildings supervised with A.D.T. private fire-alarm and sprinkler systems. For convenience of operation we also have 47 phantom boxes located at strategic points throughout the city. As time and means permit, these will be provided with the regular street box.

This Division is constantly endeavoring to extend and improve its fire-alarm telegraph system. We most strongly urge the use of the fire-alarm box for transmitting an alarm of fire, because it is more dependable and less likely to cause mistakes, and it insures a faster and more adequate response of fire companies.

We have 460 miles of conductors, comprising 193.2 miles underground cable, 46 miles aerial cable, and 220.8 miles aerial wire. Alarms transmitted from our 595 boxes numbered 927 true and 361 false in 1935, and 801 true and 304 false in 1936.

Fire Prevention Important

Fire prevention is one of our most important duties. In 1935 a model fire-prevention ordinance provided for the government of the fire-prevention bureau and the enforcement of fire regulations. These consist of the State Standards of Safety, the City Building Code and the National Electric Code. The immense value of service rendered by the Louisville Bureau of Fire Prevention, with city-wide inspections, is proved by the reduction in fire hazards, and the commendation accorded it by the insurance companies.

The Division of Fire operates under civil-service regulations and training schools on a regular scheduled basis. By these methods a well-trained and disciplined force is constantly maintained, similar to that aboard a first-class battleship.

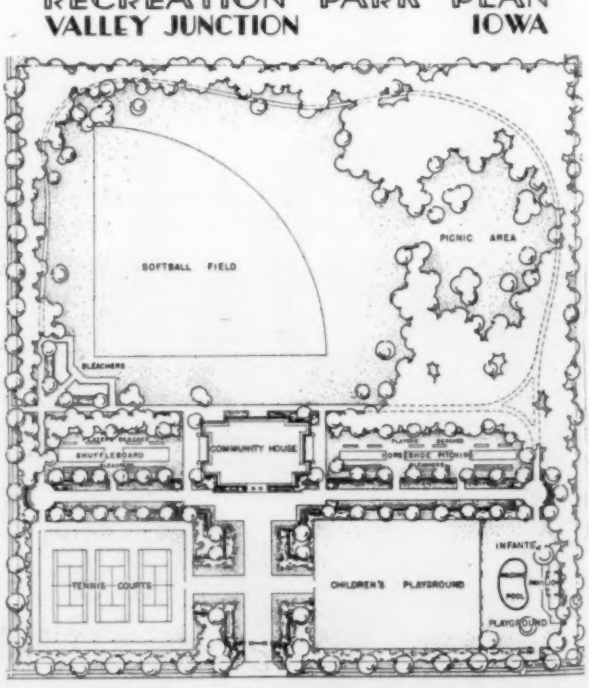
In view of accomplishments in the last two years and our plans for the coming year, I can say without fear of contradiction that Louisville's citizens receive full value for the $2 per capita they pay for their well-equipped fire-fighting force.

Planning for Recreation in Iowa

THE Iowa State Planning Board, in cooperation with the Agricultural Extension Service of Iowa State College, is gathering together the basic factual material necessary to the formation of a comprehensive long-term recreational program for the state. One phase of the study consists in the location and physical inspection of every existing public or semi-public area where leisure is spent. Also, an attempt will be made to establish exact locations of potential areas for future leisure-time programs. The townships in each county are to be responsible for conducting and summarizing this inventory.

The second phase of the recreational survey consists in the circulation of 20,000 individual questionnaires to a representative cross-section of the population. Opportunity is provided for indication of every type of indoor and outdoor activity, in the home and away from the home, and the frequency of performance.

Professor Fitzsimmons of Iowa State College, who is in charge of this survey, states: "With the trend toward shorter working hours, leisure will be increased, making it necessary for public agencies to make additions to present recreational areas and facilities already proving inadequate."



THE ABOVE PLAN WAS PREPARED BY THE IOWA STATE PLANNING BOARD FOR THE CITY OF VALLEY JUNCTION AS A RECREATION PLANNING DEMONSTRATION. THE PLAN HAS BEEN OFFICIALLY ADOPTED BY THE CITY AND THE PARK IS BEING CONSTRUCTED AS RESOURCES BECOME AVAILABLE. LABOR IS BEING OBTAINED THROUGH THE WORKS PROGRESS ADMINISTRATION.

For Better Places to Park

By ROBERT C. WEINBERG
Architect, New York

WHEN the owner of the site of the former Belmont Hotel, opposite the Grand Central Terminal, New York, applied for permission to utilize it temporarily for a parking space, he was met with the united opposition of the 42nd Street merchants. Why? Because to them "parking space" has a very definite association with certain familiar, messy characteristics, which usually are present. It would obviously be harmful to their trade to have visitors greeted with a nondescript collection of cars on a vacant lot, whose boundaries would be marked at very best by a ramshackle wooden fence; whose pavement, if any, would be fragmentary, and whose condition would be comparable to that of the country fair grounds the day after the circus had moved away.

Now, no one can blame the man who objects to this sort of thing. He not only objects to the general appearance of the ordinary parking lot, but also to the noise and hazards which so frequently accompany it. It is a natural—and unfortunately justifiable—assumption that parking spaces are undesirable neighbors. But again let us ask, "Why?"

Consider the sequence of events which has led up to this state of affairs. The parking space has generally been the temporarily used vacant lot awaiting other disposition. It is easy to deduce from this fact why no one spends money fixing up something which is going to be used for something else almost any day. But is it not logical to assume that if space allowed for parking could be a permanent use of that space, it would follow that then the appearance and planning of the space could be given more attention?

Some Definitions

Looking at the other side of the question: As long as we have automobiles, we shall need places to put them when not in use. These places are divided into two general classes. The first is the place where the automobile is habitually kept overnight and for longer periods of time. This place is known as the *garage;* and, although a new type of structure which has appeared in our communities only within the last generation, it has nevertheless definitely earned an important place in all zoning ordinances, building codes and other official means of regulating construction.

The other general class of places where automobiles are kept is as yet far less well-defined. Briefly, it is the place or places where a car is put for a short period—ranging from fifteen minutes to possibly as many hours—while its driver is attending to business, entertaining himself, paying a call or doing any of a number of different things in different parts of the community before he gets back in his car and drives it to his garage. The action of the driver in leaving a car in this way is known as *parking;* and although there has been, in most cities, little regulation or determination of how and where such action shall take place, it is nevertheless a matter urgently demanding proper attention. The more congested the district in which parking takes place, the more important it is that the space be properly located, laid out and regulated. Unfortunately, existing conditions are almost directly in contradiction to this; that is, whereas we have fine parking spaces laid out in certain progressive suburban districts, parking in our urban centers is relegated almost entirely to the sort of temporary parking space which most of us associate with disorderly conditions; or, on the other hand, a portion of the public domain known as *streets* is used, free of charge, for a storage purpose for which it was never intended.

What to Do

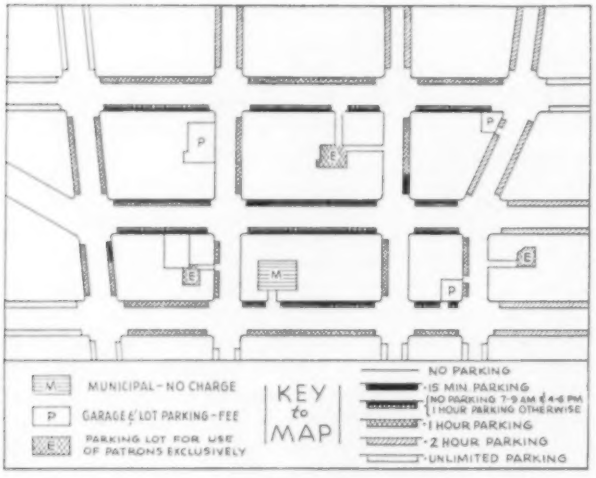
A properly designed parking space should serve the following purposes:

1. Relieve the public streets and thereby simplify traffic.
2. Provide convenient parking space, at a small charge, for the legitimate visitor to the given neighborhood.
3. Increase the economic return from the space used.
4. Where it is possible so to plan it in conjunction with other structures, to provide an open space where there would otherwise have been none.

These are the ends which can be accomplished, but, up to now, general neglect of the problem in our urban centers has resulted in many parked cars obstructing traffic on city-owned streets, and in a few cars standing on ill-assorted vacant lots, depreciating values, and unrelated to any plan.

This difference between what is and what should be presents a new problem to architects and city planners. There are two ways of approaching the problem. The first is to set up the "environment." This means studying the needs of the community to determine the proper relation of parking space to traffic conditions, as well as the uses of the buildings which it is to serve. It also means correcting the prejudice against parking space, due to the circumstances which we have just discussed, and convincing zoning officials, civic bodies, individual landowners, and others who hold up their hands in horror at the mere mention of a parking space, that what we are proposing is not to be a detriment but an absolutely necessary benefit to their neighborhood.

The second way of approaching this problem is *to design the thing right.* This is the architect's job, pure and simple. After the city planner has decided where the space may properly be located, and how much of it is to go there, and after he has exerted his best efforts toward securing unprejudiced consideration of parking on the part of those whose cooperation is necessary, it becomes definitely the architect's business to give the parking space the same detailed consideration which he would give to any other


M MUNICIPAL - NO CHARGE
P GARAGE & LOT PARKING - FEE
E PARKING LOT FOR USE OF PATRONS EXCLUSIVELY
KEY to MAP
NO PARKING
15 MIN. PARKING
(NO PARKING 7-9 AM & 4-6 PM 1 HOUR PARKING OTHERWISE
1 HOUR PARKING
2 HOUR PARKING
UNLIMITED PARKING

Parking restrictions must be adapted to traffic needs. Off-street loading and parking facilities should be provided in areas of dense traffic. The above example illustrates the restrictions which were necessary in one specific case.

ADAPTING PARKING FACILITIES TO TRAFFIC NEEDS
From the National Safety Council's 1937 pamphlet, "Engineering for Traffic Safety"

project. He must study it from all points of view, economic, structural and esthetic. And when he does this he should be thinking in terms not of a temporary arrangement, but of something permanent.

I wish to develop at greater length this second approach to the parking space problem. Let us consider it immediately from the economic point of view. It is obvious that a parking space by itself is not likely to be economic in a neighborhood where land costs are high. This, nevertheless, is the very place where parking space is most needed. It follows, therefore, that in urban centers a parking space must be combined with some other uses.

PARKING LOTS REPLACE ALLEY SLUMS IN WASHINGTON, D. C.

At top—Entrance to O'Brien Court, before rehabilitation. The alley in the foreground turned to the right and was then flanked by two rows of houses. There were two other groups of alley dwellings in this block's interior

Second view—Street frontage of the parking lot created by the Alley Dwelling Authority for the District of Columbia on the site formerly occupied by O'Brien Court and two other inhabited alleys

Space Within, Below or Around Buildings

There is, in the first place, the possibility for using the interior part of a large office building for parking purposes. In New York City the building code does not yet permit this, but in many other cities it has been shown successfully that space too dark or other wise undesirable for office use can be turned to good profit for the temporary parking of cars.

From this follows the related possibility of using one or more basements of a commercial building for parking space in the case where all of the other available floor space can be profitably used otherwise.

Both these possibilities would apply to an already overbuilt section in which no free space was available, but it is becoming increasingly obvious that office-building bulk should be so limited that the higher a building the more space should be left around it. This open space, because of improvement it brings to the character and value of the building, cannot be regarded as altogether thrown away. To use part of it for parking purposes would increase its economic usefulness, as well as create an additional convenience for the tenants of the buildings.

The next step from this is to use not only the space surrounding the building but the space that is *under* the building. Progressive architects do not need to be told of the potentialities of eliminating the ground floor and placing the building on "stilts," so to speak, leaving the entire street level free for circulation. In buildings where store space on the ground floor is not essential, the apportioning of this entire space for circulation of traffic, parking of cars, general recreation, and other uses, offers opportunities for effective land utilization.

Parking for Pleasure Seekers, Commuters and Industries

Whereas the office buildings in urban centers create the most frequent demand for parking space, there are other important demands to be considered. Probably the first of these is the theater district. Whereas the proportion of demanded parking space to seating capacity of adjacent theaters has not yet been worked out, a parking space operator has been quoted as willing to pay 25 per cent more per square foot for well-located space in a theater district than he would pay in an office-building district. This particular phase of the parking problem must be studied anew in each community, since the transportation habits of theatergoers vary considerably from city to city. It is not unreasonable to assume, however, that in any given community a definite ratio of parking space to seating capacity can be attained by proper research and that the facts thus secured can and should be used in planning for parking space in relation to any new theater building project.

Related to the theater classification is that of other recreational centers. A study of the well-designed parking fields which have been constructed in connection with such projects, around New York, as the Westchester County Recreational Center, Playland, and Jones Beach, indicates not only that a large and legitimate income can be secured from parking, but also that a very definite ratio can be es-

tablished between the number of persons using any recreational facilities and those coming by automobile. The full utilization of this knowledge in planning places of entertainment in city or country, congested urban center, or outlying park, is still a matter for architects to make full use of.

A combination of parking space with recreation ground in general and with playgrounds for children in particular, may seem at first unusual, and it is possibly undesirable in theory and to be avoided in laying out a brand-new city. Structurally, however, such a combined playground and parking space can be worked out very simply when there are differences of level within the length of a city block, so that cars can enter at the lower grade, and an open playground can be built above it on the upper grade.

The arrangement of parking space in connection with railroad stations, particularly, in the suburbs of large cities, demands increasing attention, and in many cases replanning. It is especially in the suburban centers that there is also reason for what is becoming known as "park-and-shop" markets, and it is extremely simple to combine these two uses. Thus, the proper designing of a parking space in relation to both commuting and shopping facilities can benefit financially not only the railroad but the owners of adjacent store properties. And, what is more important than either of these results, it will create a better community, and one which will attract more residents, and consequently affect not only land values but social values as well.

Related to this is the consideration of the more urban department store, which may be so located or built that parking space in, under, or around it is possible, and where enough of its patronage comes in self-driven cars. It goes without saying that this should not be left until after the store is built.

In a metropolitan region, numerous other points suggest themselves as improvable by planned parking spaces. For example, there is the service station located near a bridge head, ferry terminal or other point of change of transportation, where car users are likely to leave their cars and continue their journey in some other conveyance. A service station catering to this trade will increase its patronage if it has a well-planned parking space.

For industries which are not located close to the place of residence of the workers, parking spaces have now become an absolute necessity. They can and should be *planned* in relation to the factory or to a group of plants.

To Overcome Objections

To secure favorable action, it is essential that advocates of the kind of parking spaces herein recommended should point out to all concerned the distinct difference between parking a car and putting it in the garage. Many of the objections raised against the establishment of parking spaces or "parking-garages," so-called, in retail districts arises from prejudice due to the familiar conditions of real garages. Of these, a majority, doubtless, bring with them certain factors of noise, dirt, undesirable hangers-on, etc., which justify the relegation of garages to a safe distance from retail business or residential districts. There is no reason at all, however, for assuming that a well-planned and well-operated parking space should display any of the disagreeable features which now characterize the poorer class of garage.

There is no doubt that we are living in the motor age; and that parking is a resulting need on the part of people in all American communities. It creates a demand for a new sort of land usage. Public officials, planners and architects who recognize this fact, and take into full consideration its many potentialities, render real service to their communities and their clients.

ONE OF THE FREE PARKING STATIONS ON THE COUNTRY CLUB PLAZA IN KANSAS CITY

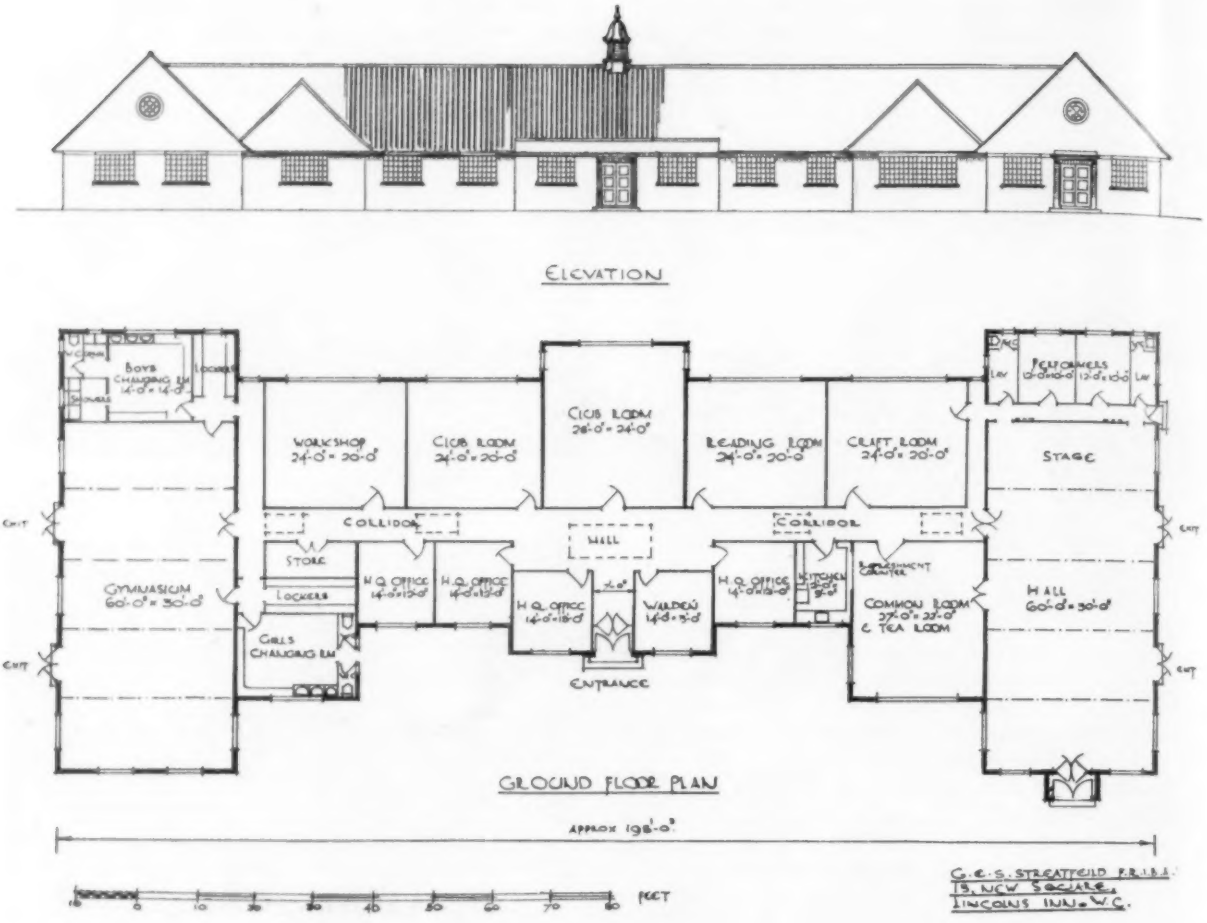
ONE OF THE MANY SPACIOUS PARKING AREAS IN THE LONG ISLAND STATE PARKS

PART OF THE PUBLIC PARKING AREA BACK OF THE SHOPS IN ONE OF THE BUSINESS BLOCKS AT WILLIAMSBURG, VA.

This area and a similar public parking area serving shops on the opposite side of Duke of Gloucester Street in Williamsburg were designed in connection with the restoration of this historic city

EDITORIAL NOTE.—For a discussion of "The Economics of the Parking Lot," see article under that title by Walter H. Blucher, in *The Planners' Journal* for September-October, 1936.

A discussion of the use of parking meters in streets as affected by statutes and ordinances in four different states is presented in the department of Zoning and Planning Notes in this issue.



Suggested Juvenile Community Center for an English Housing Development

THIS design has been prepared for the National Council of Social Service [of Great Britain] to illustrate proposals framed by representatives of some of the leading national organizations working with boys and girls on new housing estates. It is intended to show how a building of this size could provide for four or five organizations (1) a headquarters room or office; (2) a share in the use of a gymnasium, hall and other accommodation for special activities. Opinions will of course differ as to the best arrangement of such accommodation.

The center would thus supplement the smaller and less well-equipped premises in which units connected with, e.g., religious and social organizations, carry on much of their work.

The work of a large number of small clubs, brigades or Scout troops in different parts of the estate would be greatly assisted by the provision of such additional central facilities, and they would share in the advantages provided without losing their own identity.

The accommodation provided is as follows:

Gymnasium 60 ft. by 30 ft.
Changing rooms for boys and girls, about 15 ft. by 14 ft. each, with lavatory accommodation and cloak rooms with 100 lockers in each.
Shower baths for the boys.
2 club rooms 24 ft. by 20 ft. and 24 ft. by 28 ft.
A library 24 ft. by 20 ft.
A workshop 24 ft. by 20 ft.
A craft room 24 ft. by 20 ft.
A common room with kitchen and canteen adjoining 27 ft. by 22 ft.
4 offices 14 ft. by 12 ft. for the headquarters of various organizations
1 office 14 ft. by 13 ft. for the Warden.
A hall 60 ft. by 13 ft. with two rooms for performers 10 ft. by 12 ft. and necessary sanitary accommodation.

The hall adjoins the common rooms and is connected by folding doors, so that in any entertainment where refreshments are provided the common room can be available for the purpose. There is a door into the craft room to allow this room to be used in connection with the stage, so that properties, etc., can be made there, and the room used during performances if required. One of the lavatories attached to the stage would be available for the staff.

An entrance hall is shown, off which the library, two club rooms and four offices would open. The entrance hall is 34 ft. by 11 ft. The central corridor, 6 ft. wide, would be lighted by ceiling lights. A store room for equipment, etc., is provided, 16 ft. by 6 ft. It is proposed that an outbuilding should be provided for camping equipment, etc., available for the various organizations. Heating by low-pressure hot water, with chamber where most suitable as regards levels of site. Ventilation by trunks in the roof and extract over entrance hall.

Approximate estimate—£8,000 to £10,000.

—From the "Report on the Need for Youth Community Centers on New Housing Estates," by the Juvenile Organizations Committee of the Board of Education of Great Britain.

Water-Supply Problems of the United States

National Resources Committee Reports on Public Works Planning for Future Water Supplies

OF natural interest to the cities of the United States is that portion of the National Resources Committee report on Public Works Planning which deals with the municipal water-supply problems of the great drainage areas. In order to present the water-supply phase of this report to the readers of THE AMERICAN CITY, a summary by districts has been prepared.

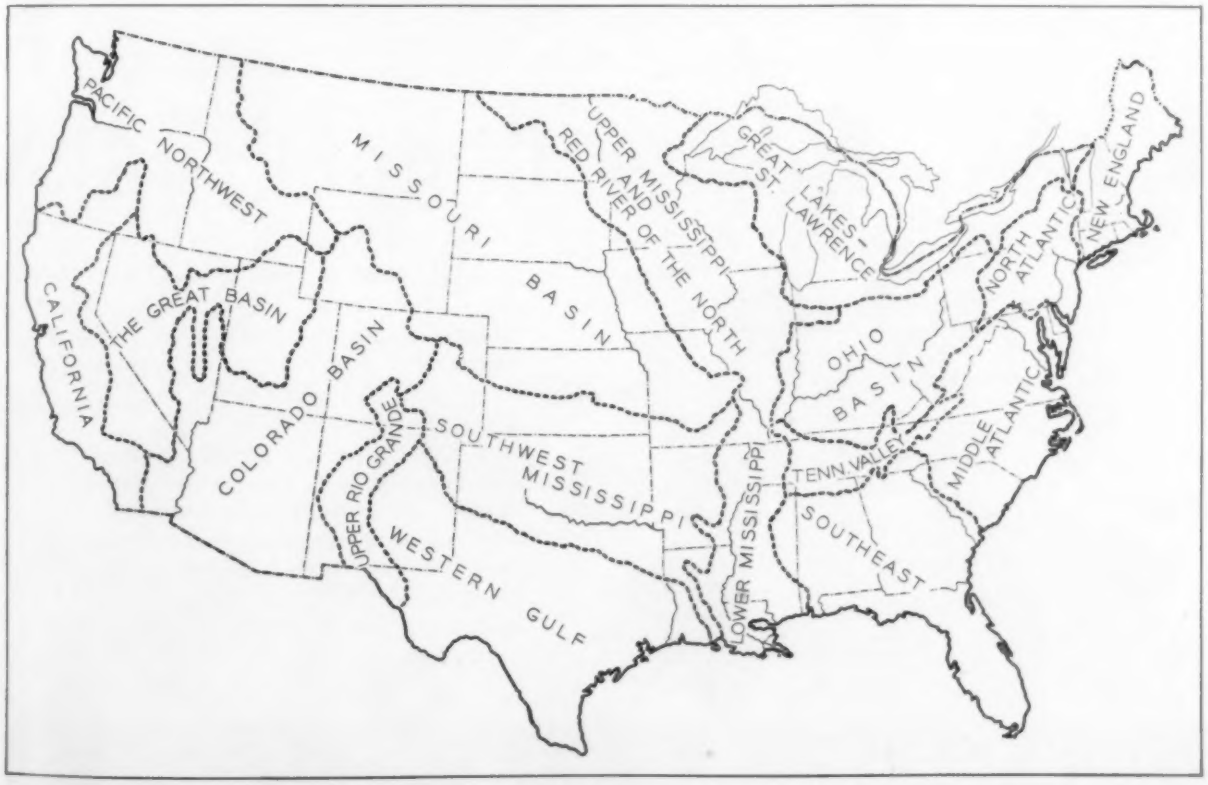
New England Water Supply Satisfactory

On the whole, public water supplies in New England are of good quality and adequate for present purposes. The water is taken, for the most part, from natural and artificial reservoirs, but in a few instances rivers and wells serve as sources of supply. The water-supply problem pertains almost wholly to extension of existing works for domestic use or for fire protection. Some towns which have relied upon private wells have grown to such size that provision of new supplies is probably justified to protect health and property.

North Atlantic Water-Supply Problems

The North Atlantic drainage basins comprise the Hudson, Delaware, and Susquehanna River systems, and the contiguous coastal plain from Bridgeport, Conn., to Indian River, Del. About one-sixth of the entire nation lives in this district. About two-thirds of this population live in two metropolitan areas—New York and Philadelphia. The scope and urgency of the principal water problems, those of supply and pollution, result from the size and nature of these great urban concentrations.

New York City and its urban satellites, particularly the municipalities in northern New Jersey, face immediate expenditures exceeding $300,000,000 on new and additional water supplies. Philadelphia and its neighboring communities will soon take steps in the same direction. The additional water supplies for both groups of cities



DISTRICTS USED BY NATIONAL RESOURCES COMMITTEE IN PUBLIC WORKS PLANNING REPORT

STREET *Flushing*

Note: Flusher is cleaning entire width of street washing under parked cars at curb.

CLEANS *Under* PARKED CARS

South Bend

The famous South Bend Street Flushers are built in various tank-capacity sizes; mount on any truck or trailer chassis. Write MUNICIPAL SUPPLY CO., South Bend, Indiana, for complete information.

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FOR A CLEANER HEALTHIER CITY

FUNDS PROPOSED FOR PUBLIC WORKS PROJECTS IN THE WATER-WORKS FIELD BY THE NATIONAL RESOURCES COMMITTEE

Basin or District	Investigation Projects	Immediate Construction	Deferred Construction
New England	....	$18,768,000	$5,067,000
North Atlantic	$75,000	326,252,000	1,179,000
Middle Atlantic	10,000	12,584,000	20,233,000
Southeast	30,000	5,252,000	2,578,000
Tennessee Valley	....	550,000	1,153,000
Ohio Basin	....	1,194,000	3,515,000
Great Lakes—St. Lawrence	10,000	32,642,000	22,581,000
Upper Mississippi—Red River	441,000	33,176,000	5,728,000
Missouri Basin	205,000	10,798,000	2,480,000
Southwest Mississippi Basin	205,000	14,755,000	4,106,000
Lower Mississippi	....	1,270,000	951,000
Upper Rio Grande	....	....	....
Western Gulf	325,000	2,815,000	2,235,000
Colorado	315,000	1,261,000	572,000
Great Basin	....	89,000	833,000
California	30,000	3,539,000	265,000
Pacific Northwest	328,000	1,462,000	1,645,000

will come from the Delaware River system, a fact that indicates the wisdom of rating the provision of public water supplies as the highest use of the Delaware River tributaries. The experience of these cities should serve as a warning to other cities and groups of cities to look years ahead and provide themselves with potential water supplies to care for future needs. For this purpose, comprehensive investigations of both underground and surface water resources are essential. For the purpose of utilizing these resources when need arises, plans should be formulated now for cooperation through interconnection of systems and the formation of metropolitan water districts.

The Middle Atlantic Basin

While the report devotes more consideration to sewage-treatment and hydroelectric projects in the Middle Atlantic Basin, it does point out that water-supply as well as sewage-treatment improvements constitute the chief immediate steps in water-conservation programs for the basins of the rivers flowing into the Atlantic between the Potomac River at the north and the Edisto River at the south. In most of the sections of this large basin there are towns which lack public water supplies, sewers, or sewage-treatment facilities. A few of the large urban areas—notably Cumberland and the suburban areas of Washington and Baltimore—require extensions of present water-supply systems.

The Southeast

In this section, comprising mainly Georgia, Alabama and Florida, municipal sewers, sewage-treatment, and water-supply facilities have failed to keep pace with the growth of population and with technical improvements in many towns and cities. This is true particularly of the Piedmont manufacturing area, in commercial centers of the coastal plain of Alabama and Georgia, and in the fast-growing recreational resorts of Florida. Some of these urban areas are without sewer facilities. Others have sewer systems inadequate to carry away the rainfall from intense storms, while still others discharge raw or partially treated wastes into streams which serve as a source of water for cities, or into coastal waters which support fisheries. The water supplies of certain cities on the coastal plain in Alabama and Georgia—many of them highly mineralized—are threatened by overdraft on underground reserves, and by salt contamination. In many municipalities in the Piedmont section inadequate wells should be replaced by reliable sources. Plans are now available for widespread extensions for plants to treat relatively unpotable water and for the extension of water mains and water-storage facilities. Miami, Tampa, Tallahassee, Macon and scores of small municipalities are involved.

The Tennessee Valley

The section devoted to the Tennessee Valley deals chiefly with navigation, flood control and power development. Mention is made, however, of the need of new water-supply systems and enlargements of old systems in Cherokee, Leighton, Rogersville, Town Creek, Courtland, Moulton, Sheffield and Tuscumbia, Ala., and in Crossville, Tenn., as immediate projects.

The Ohio River Basin

The Ohio River is a sewer, a source of water supply, an outlet for floods, and a highway. One-seventh of the population of the United States is concerned directly with the waters of the Ohio Basin, which present grave dangers and great opportunities.

The importance of sewage treatment on the Ohio River is evidenced by the fact that the river system now furnishes the chief means of disposal for nearly all the waste products of the many communities that line its banks, and provides the water essential to the health of millions of people and to the operation of thousands of industrial plants. The pollution of the main river and some of its tributaries by untreated domestic and industrial wastes creates a constant and serious threat to public health. Acid drainage from mines complicates the problem. It is estimated that the sewage produced by 6,500,000 people drains to the Ohio River directly or through tributaries. Less than 30 per cent of the sewage receives any treatment. On days of minimum flow, about one quart of every gallon of water in the main river at certain points has passed through a sewer system. This grossly polluted water after filtration is used as drinking water by 2,500,000 people. A determined attack on the pollution problem of the Ohio River system is imperative, and for that purpose various undertakings are included in the National Resources Committee Public Works Planning Program.

The Great Lakes—St. Lawrence

The metropolitan areas on the shores of the Great Lakes have drawn freely upon the lakes' water supply. They have also dumped waste into the lakes indiscriminately. Chicago is now completing its great sewage-treatment plants, but the adjacent manufacturing towns in Indiana have continued to contaminate the lake waters with sewage and industrial waste. The raw sewage from the northern Indiana cities should be treated, and provisions should be made against discharge of the effluent into the lake during flood periods on the Calumet River. Waters also are unduly polluted by sewage at Duluth and Detroit. At these points, as well as at the southern tip of Lake Michigan, sewage-treatment plants are necessary for the maintenance of satisfactory public health conditions. Plans for appropriate works are ready in most cases, and construction should begin promptly. Sewage-treatment plants also are in demand in the densely populated valleys tributary to Lake Ontario, and in the Lake Champlain and St. Law-

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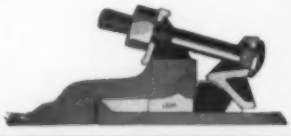

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rence areas where recreational use of water is dominant. In addition, filtration and water-treatment plants are required at a few of the above-mentioned cities, and at Chicago, Duluth, Akron, and Cleveland extensions of the water-supply systems are warranted by growth in demand for water.

The Upper Mississippi and the Red River of the North

The principal uses of the Mississippi River above St. Louis relate to the disposal of wastes, to navigation, to municipal water supplies, and, to a limited extent, to water power. The river serves as a sewer and is seriously polluted below certain large cities. As a result, fish life, water-supply sources, and recreational facilities are greatly impaired. Wastes from an urban population of about 8,000 affect the stream from which various municipalities draw their water supplies.

In a study of the Mississippi River above St. Paul it is shown that flow correction to safeguard the future water supply of St. Paul and Minneapolis and to enhance natural recreational facilities is the first objective. On several of the tributaries it is suggested that reliable surface sources of water supply be created in the event that underground supplies become inadequate or unsatisfactory. On practically all the streams the question of the creation of new water-supply sources is important.

The plan for the drainage area of the Red River of the North provides for such diverse but interrelated matters as abatement of stream pollution, control of low-water flow, improvement of municipal and rural water supplies, correction of flood flow in streams, protection against grave distress from future droughts, enhancement of recreational values in natural lakes, wildlife conservation, and promotion of the utility of water for power development.

The Missouri Basin

The provision of water for irrigation is uppermost among the water problems of the arid western third of the Missouri Basin. The only reference to the furnishing of water for domestic use is the provision for wells for domestic use which would measurably increase the comfort of Great Plains occupants, but which would not affect the basic problem of wresting a living from the hazardous semi-arid environment.

The Southwest Mississippi Basin

This includes the basins of the Arkansas, White, Black and St. Francis Rivers. In the basins of these rivers the principal problem is concentration on water irrigation and grazing, while in the basin of the Red River the underground water resources are most important. At present these resources of the Texas high plains are adequate for municipal supplies and for supplementary application through pumping for the improvement of agricultural production, but in some sections the water is not fit for drinking purposes, because of its high fluoride content. The part of the basin below Denison, Texas, has ample rainfall for crops, but there is a definite deficiency of surface water for urban supplies in various localities and a seriously unsanitary condition in the streams every summer.

The Lower Mississippi Basin

Water problems in the lower Mississippi Valley relate chiefly to protection against flood waters and to their disposal, rather than to the conservation of water for man's use, although seventeen small water-supply projects are listed.

The Upper Rio Grande

Life in the upper Rio Grande Valley, above Fort Quitman, Texas, depends on water, and the outlook for the valley through many years depends fundamentally on decisions likely to be reached in the immediate future with respect to its water problems. The problems, however, are not those of domestic water supply but rather of irrigation.

The Western Gulf Basin

This basin, which extends roughly from the Red River along the coast of the Gulf of Mexico and to the Rio Grande, has problems involving flood control, the provision of fresh water supplies for irrigation and municipal and industrial purposes along the coast; conservation of water for irrigation in the semi-humid section, development of underground water supplies where there is little surface run-off; correction of pollution from sewage and from oil well and refinery wastes; and settlement of conflicts over the waters of some of the streams.

The Colorado Basin

The basin of the Colorado River embraces parts of seven states, together with a small area in Mexico. The mountainous rim of the upper basin has a moderately heavy precipitation, cold winters, and a short, hot growing-season. The lower basin is very arid, has mild winters and hot summers, and is favored by a growing season that lasts throughout the year. The urban population of the basin in 1930 was 225,000; the rural, 552,000. A population of 1,120,000, urban and rural, has been predicted for 1960.

The water resources of the Colorado Basin have been studied heretofore largely in terms of state and municipal interests. The National Resources Committee suggests that they should be studied likewise in terms of the basin as a whole, in terms of inter-basin relationships, in terms of national welfare, and in terms of international relations.

The projects listed for the Colorado Basin are divisible into three groups. The first is the Boulder Canyon group, those pertaining to the main Colorado and those downstream from Boulder Dam. They constitute a well-coordinated system, supplemental to and dependent upon the Boulder Canyon project.

The second group relates to municipal improvements, irrigation, flood control, and recreational projects that are situated away from the main streams and that are related only remotely to the Boulder Canyon project. They are dependent upon the general social developments within the basin, which the first group will stimulate.

"TROUBLE IN MOROCCO"

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by Lowell Thomas

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"When they filmed 'Trouble in Morocco' they had plenty of trouble getting motorized equipment that could travel the 'camel country.' I've crossed the Sahara. I know what a job it is to get through with even a light passenger car, crawling along slowly. When you take heavy equipment, push the accelerator to the floor, plow through burning desert sand, it's torture for tires!

"Believe me, there were plenty of thrills, hazards and perilous moments in making this picture.

"There was no place for sissies in the cast—and no place for 'weak sister' tires on the job."

Larry Darmour, producer for Columbia distribution of this feature picture starring Jack Holt, chose Goodrich Silvertowns for their armored cars. And many *of* Hollywood's largest studios use Goodrich Truck Tires for hauling cameras and delicate sound equipment. Where tires matter most, that's where you find Triple Protected Silvertowns.

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Every Goodrich Truck Tire has a new invention built into the sidewall—a 3-way check against blow-outs and sidewall breaks. This protection actually checks 80% of premature failures! It strikes right at the cause of tire delays. Here's how it works:

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The third group is concerned with the procurement of physical data so essential in character that the general development of the basin cannot proceed along rational and economic lines without them.

The Great Basin

The Great Basin is comprised of western Utah, Nevada and a portion of southeastern California. Scarcity of water has limited the utilization of the land resources of the Great Basin. The stabilization of agriculture and manufacturing activities in this arid, intermontane area and its further economic development will hinge in large measure upon the degree to which meager surface supplies of water can be conserved, new underground supplies discovered and utilized, and additional supplies imported from the Colorado Basin.

Although no water which falls in the Great Basin flows to the sea, the volume of water flowing in streams to inland lakes and alkali "sinks," or accumulating in valley fills, is insufficient to serve many current needs, not to mention prospective needs. The normal flows in most of the streams which together drain the numerous small basins are utilized completely or almost completely for irrigation and for municipal purposes. The waters of Provo River and of other streams draining into Great Salt Lake are fully appropriated. The streams naturally tributary to Humboldt Sink are entirely diverted for irrigation in normal years; some of their water reaches the sink only in rare years of excessive rainfall. Various streams in southeastern Oregon, western Nevada, and southeastern California likewise are put to complete use for the irrigation of cash crops or for forage of live stock grazed on adjacent pastures. From time to time, Salt Lake City, Ogden, and other municipalities have experienced a shortage of water for domestic purposes. Lack of fresh water for condensing purposes has prevented large-scale generation of power from Utah coal. Even feeding grounds for migratory waterfowl are at a premium. A population only equal in number to that of Rhode Island finds barely enough water to meet current needs in an area comprising one-fifteenth of the United States.

The practicable means of obtaining more water in the Great Basin at reasonable expense include: (1) additional surface storage; (2) reduction of losses from river channels and lakes; (3) elimination of waste in applying water to land; (4) utilization of underground waters; and (5) diversion of water from other basins having superabundant supplies.

California

The California district, as delimited for the study of the National Resources Committee, comprises all of the state of California except the desert area lying east of the Sierra Nevadas, together with a small part of southern Oregon. The outlook for this large area, with its fast-growing population of more than 6,000,000, depends chiefly upon the supply of water that can be made regularly available for essential purposes. In the future, as now, the extent of its agriculture will be limited by the supply of water for irrigation. In the future, even more than now, its industries will depend for power on hydroelectric energy. The future of its cities, no less than that of its farm lands and factories, will be influenced greatly by the supply of water available to them. In comparison with the need for more water, the need for better water through abatement of pollution, the need for additional river improvements in behalf of navigation, the need for further development of water bodies for recreational use, and the like, all are of minor importance. Even the flood problem, though urgent in some localities, is less fundamental than the requirement for more water to replenish or replace underground supplies for irrigation and to provide adequate domestic supplies for the areas of denser urban population.

Realizing years ago that the future of California was tied up with the future of its water supply, the Legislature directed the State Engineer to conduct a state-wide investigation of water needs and water resources and to formulate a comprehensive plan for water development. The resultant "State Water Plan" was completed in 1931. It involves a long-range projection of the California water problem into the future, and an outline, with some of the detail sketched in, of a program to implement the plan. The investigation upon which the plan is based disclosed the fact that the more serious water shortages of California were in the Los Angeles metropolitan area and the San Joaquin Valley.

To solve the difficulties of the Los Angeles metropolitan area, the plan proposed to divert water from the Colorado River through an aqueduct 249 miles in length. Several years ago the Metropolitan Water District of Southern California was formed to construct this aqueduct at an estimated cost of more than $200,000,000. The great aqueduct is now far advanced toward completion.

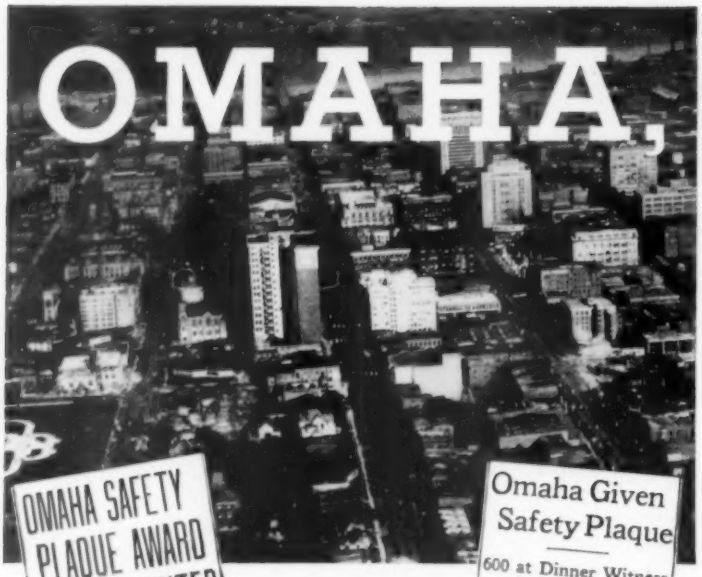
The Pacific Northwest District

The Pacific Northwest District comprises all drainage areas of the United States tributary to the Pacific Ocean north of the Smith River near the California-Oregon line. The regional water problems of the district are differentiated by natural and cultural conditions. West of the Cascade Mountains, precipitation is heavy on the mountain slopes and adequate for various crops in the lowlands, irrigation is chiefly supplemental in type, floods are frequent along many streams, navigation is important and tied intimately to ocean shipping, and the population of the lowlands is relatively dense. East of the Cascades, precipitation in most places is very light, irrigation is indispensable to successful agriculture in many localities, floods are less frequent, navigation is unimportant, and the population of most of the area is sparse. Both west and east of the mountains, natural conditions are favorable for the development of large amounts of water power. The domestic water-supply problem is not important in this district; the power problem and irrigation take up practically all the report of the National Resources Committee on this District.

FEDERAL-LOCAL PUBLIC WORKS PARTNERSHIP

Employing the opportunity for a Federal-local partnership under the Public Works Administration, local communities have voluntarily furnished more than $1,697,000,000 from local resources to secure permanent and useful public works.

The non-Federal total has made possible civic improvements estimated to cost $2,422,146,074. PWA grants totaled $724,595,602. These figures include the $201,089,500 which was loaned to 32 railroads for expenditure in 43 states.



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Omaha Given Safety Plaque

600 at Dinner Witness Formal Award

Omaha formally received its first place award for 1936 traffic safety, presented by the National Safety council, at a dinner Wednesday night in the Fontenelle hotel. The plaque, indicative of Omaha's top [illegible] cities ranging in popu-

Bendix-Equipped, wins 1936 NATIONAL TRAFFIC SAFETY AWARD!

ALL honor to the city of Omaha, to Safety Commissioner Jepsen, his staff, and a closely co-operating police traffic department, for their year of magnificently resultful effort in reducing Omaha's traffic casualties so splendidly!

Keeping Omaha's cars and trucks in safe driving condition has contributed much to the city's enviable record. And Bendix chassis-testing equipment provided the constant, indisputable checks and tests which sent Omaha citizens either straight to a corrective service station or on their ways in virtuous rejoicing at a "clean bill of car-health."

Bendix builds the world's most efficient and reliable chassis testing equipment. The typical Bendix Civic Safety Clinic setup provides *positively* accurate records of braking ability (individually for all four wheels), steering, wheel alignment, and as much else as you care to test. A car a minute off the line. Car factories use Bendix equipment to inspect new cars. They *know* it's reliable . . . they've GOT to know! Full details—prices—proved safety line plans—ready for you—WRITE!

LEFT: *Tests each brake separately—by full wheel revolution under electric power . . . shows total stopping ability . . . shows up "out-of-round" drums. TESTS TRACTOR AND TRAILER TRAINS accurately.*

RIGHT: *Tests wheel alignment, caster, camber, toe-in, entire steering geometry, precisely and quickly. Shows exactly what work needs to be done. Nothing left to guesswork.*

BENDIX

CIVIC SAFETY CLINIC

Equipment

BENDIX PRODUCTS CORPORATION
(*Subsidiary of Bendix Aviation Corporation*)
450 Bendix Drive, South Bend, Ind.

Send me at once full details about Civic Safety Clinic Equipment, prices, operating plan, etc.

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Business or Profession.....

City Official (title) ☐.....Dealer ☐

Street Reconstruction with Brick

By GEORGE M. SHEPARD
Chief Engineer, Department of Public Works, St. Paul, Minn.

BRICK pavements have been used for nearly 50 years in St. Paul, Minn., mainly on heavy-traffic business streets, along street-car lines, on grades, on bridges, and in areas where extensive parking of vehicles has caused displacement of other types of pavement or is likely to do so. Probably the first brick pavement laid in St. Paul consisted of five blocks laid in 1888 on Virginia Avenue. This is still serviceable although the brick used is a narrow pressed paving brick laid on edge on a sand base. Changing practice has brought streets paved with vitrified brick of various sizes and laid in various ways, from the old sand-filled brick through the various stages of cement-mortar filler to the present standard practice of bituminous filler.

The passing of horse-drawn vehicles has practically eliminated the old criticism of brick pavement as noisy. With proper attention to base construction, the mixing and placing of the mastic cushion, the culling of the brick, filling of joints and removal of excess filler, these pavements are now being laid with an excellent riding surface, and there is reason to believe that they will have an almost indefinite life.

The Paving Program

The city of St. Paul has recently completed a six-year program of street widening and reconstruction involving the condemnation of property and widening of existing roadways together with the repaving of a number of streets which were originally paved with sheet asphalt or stone blocks on a natural-cement base. In this work 3-inch vitrified vertical fiber brick were used on many important projects, including 1.3 miles of roadway widening from 41 to 56 feet, and the repaving of a 56-foot and a 40-foot roadway. On other street-widening projects where asphaltic types of wearing surface were used, parking strips 7 feet wide of 2½-inch brick laid flat were provided along the curb line to eliminate "cupping" and displacement from wheels of parked vehicles and to hold the gutter grade. The idea of a brick gutter strip is not new, for these strips were laid as long ago as 1899.

On all these improvements the old streets of 60- or 66-foot widths were widened to 80 or 86 feet or more by acquiring property on one or both sides. The property, including both lands and buildings, was condemned through the regular procedure, the cost being partly assessed against the property abutting the improvement, and the balance paid from the special bond issue passed for this purpose. The awards included the cost to the property owners of rebuilding their fronts or of tearing down their buildings. Upon completion of the building reconstruction, the basements were filled and the filling material was consolidated by flushing. Following this, the sidewalk, curb, base surfacing, street lighting and other improvements were carried out in the regular manner. This work was all done by contract, beginning in 1933 with PWA grants of 30% and later 45% for much of the work.

Non-Skid Pavement on Concrete Base

We have learned by experience that under winter conditions the present vertical fiber brick pavement, where the surface filler has been removed, is perhaps the most non-skid of any of the pavement types we have constructed. It has also been our practice, wherever possible, to utilize brick on grades exceeding 4 per cent, thus eliminating shoving and displacement of the pavement surface due to traffic, and providing a reasonably non-skid surface in slippery weather. Frequently on street-car-track streets where the rest of the street is paved with asphalt, three rows of brick are laid longitudinally against the outside rails to permit repairs to the rails without disturbing the asphalt surface.

The concrete base for this type of pavement in the business district is 7 inches thick. The base is laid according to accepted standards, with particular attention to obtaining a true surface and contour. It is believed that the ultimate surface of the pavement cannot improve greatly over the surface obtained in constructing the base, and consequently great care is taken to obtain an accurate base contour both longitudinally and transversely.

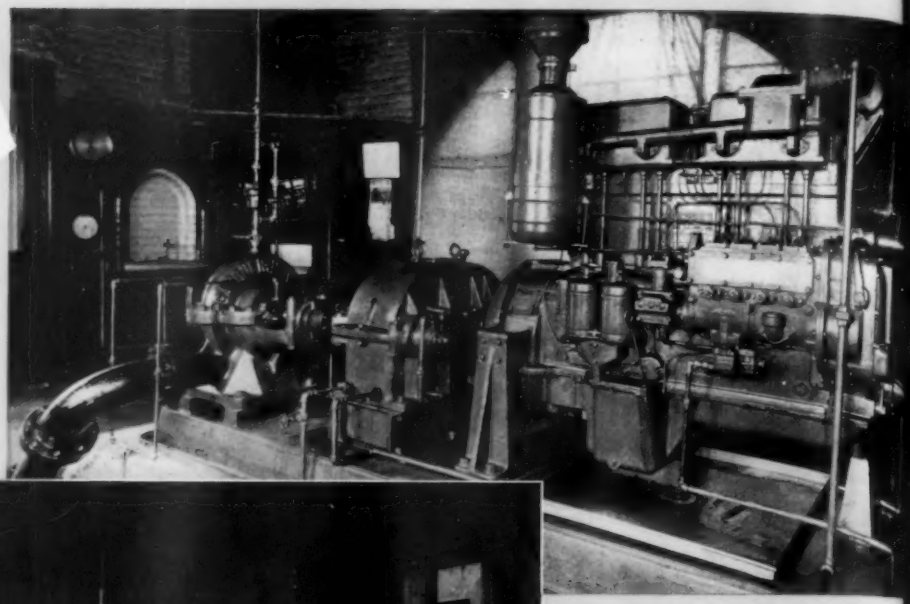
The brick are laid upon a ¾-inch cushion course consisting of moderately dry sand mixed with No. 1 heavy road oil. Approximately 7 per cent of road oil by weight is required, sufficient being used so that the resultant mixture will have a plastic consistency and so that there will be no free oil in the mastic after mixing. The road oil must be heated before mixing, and the mixing is generally done in an asphalt plant or a concrete mixer. The cushion course is dumped on the street in piles and is spread and prepared approximately 50 feet in advance of the brick laying. The cushion course is spread evenly over the concrete and then struck off for the required thickness by means of a strike board, so that the surface of the cushion will be parallel to the specified grade and crown.

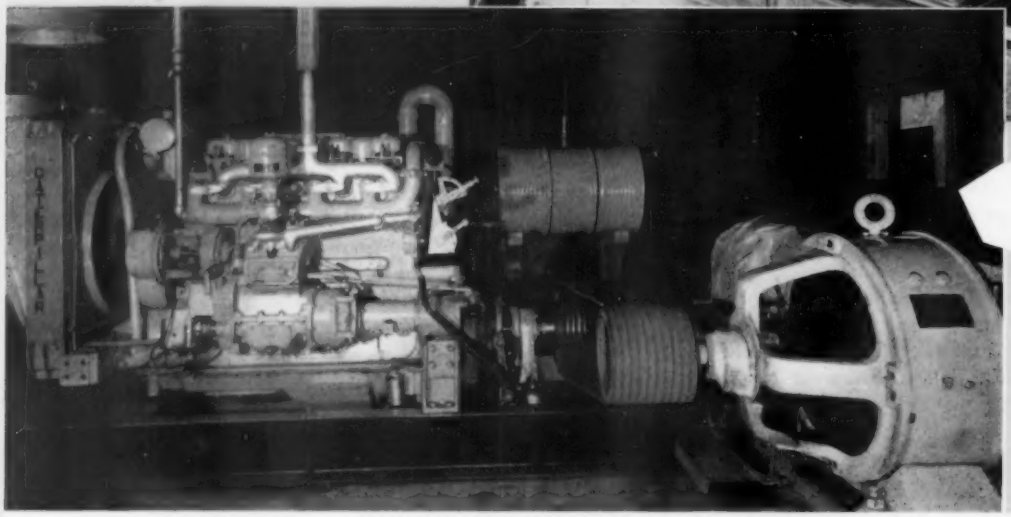
After laying the brick and rolling, they are tested with a 10-foot straight-edge and, where necessary, irregularities are corrected by removing the brick and adjusting the cushion course. After the brick surface has been rerolled, inspected and approved, it is given a treatment of a solution of 35 per cent calcium chloride, 1 per cent laundry starch and 64 per cent water by weight. This solution is applied by air pressure sprayers in the form of a fine mist, care being taken that the solution does not penetrate the joints. The asphalt filler is then applied, the excess filler being squeegeed so as to completely fill all joints. Deficiencies in application are corrected by applying filler from hand pouring pots. After the filler has been applied and permitted to cool, and deficient joints have been refilled, the filler remaining on the surface of the pavement is peeled off with scrapers, the re-use of such filler being permitted. A thin dressing of dry sand is then cast over the pavement, and the street is opened to normal vehicular traffic.

Diesel Power

GIVES THE TAXPAYER A BREAK

$6 FOR FUEL AND LUBRICATION PER MILLION GALLONS OF WATER PUMPED is the record over several months for this 80-hp. engine operating a double-suction centrifugal pump (through a speed increaser) for the municipal water works at Foxboro, Mass. The average head is 170 feet and from 800 to 900 gallons are pumped per minute.





LOW-COST CURRENT FOR 125 METERS in Pukwana, S.D. (Pop. 300), is supplied by this D8800 engine and 40-kw. generator. Rates are comparatively low, yet receipts from private customers cover free lighting of streets, town hall and churches.

FUNDS may be limited or tax collections slow, but taxpayers continue to expect low rates for water and electric current. That Diesel power is capable of helping to provide the answer is being shown in many communities. . . . The low operating cost of "Caterpillar" Diesels is not only a claim, but a provable fact. In small and medium size communities, these efficient, durable, dependable power-plants can handle all pumping or electric generating requirements. In larger communities they serve as faithful auxiliaries or ever-ready standbys. Complete information is available through the nearest "Caterpillar" dealer or direct from the manufacturer. Seven engine sizes — from 44 to 160 hp.

CATERPILLAR DIESEL ENGINES

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CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

WORLD'S LARGEST MANUFACTURER OF DIESEL ENGINES

Bridge Paving

The use of brick on bridges and bridge approaches has been particularly satisfactory. About 55 per cent of all pavement surfaces on bridges in St. Paul is of brick. On new construction which the city has sponsored under the Federal grade separation program, and which has been done under the direction of the State Highway Department, brick has been used extensively both for wearing surface and for the approaches. It is particularly adaptable to bridges with concrete slab decks, although brick laid for pavement surface on some of the old city and railroad bridges with wooden plank flooring has given very satisfactory service. The maintenance costs on the concrete deck bridges with brick pavement have been practically negligible.

Advantages of Lug Brick

The addition of lugs on the sides and ends of brick has been a decided advantage in the manufacture of paving brick as far as the user is concerned, because the lug separates the brick from each other and enables the filler to be properly retained even in extremely hot weather. A further advantage is that the separation permits rolling without the extensive corner chipping that was formerly annoying. In St. Paul we have endeavored to use as light a roller as is consistent with the proper bedding of the brick, since it is evident that extremely heavy rollers, 10 tons or more, do more damage in chipping than good in bedding the brick.

ACKNOWLEDGMENT.—Prepared from a paper presented at the annual meeting of the National Paving Brick Association.

A Correction

OWING to an undetected printer's error in the letter from Ralph C. Heath, of The Barber Co., of Philadelphia, as published on page 85 of the May issue of this magazine—an error which THE AMERICAN CITY greatly regrets—the letter is correctly reprinted herewith, and also the letter on which it comments, from H. W. Skidmore, of the Chicago Testing Laboratory:

From THE AMERICAN CITY, November, 1936, page 63:

"Records in possession of W. H. Droege, Asphalt Superintendent and Materials Chemist of Fort Wayne, show that Trinidad refined asphalt, light flux oil, cement as the filler, and local pit sand as the aggregate, were used in making the mixture for the wearing surface. No binder course was used. A bituminous cushion placed upon the concrete base supported the asphalt top.

"The tests made on the bitumen recovered from cuts made of the wearing surface and taken from this street after its long term of service are of interest. When the pavement was laid, in 1889, the Trinidad Lake asphalt cement used in the wearing surface had an average penetration of 63. A method for determining ductility was not known at that time and was not developed until years later.

"The penetration of the bitumen extracted recently was 55 at 77° F., just a trifle harder than it was when it was put into the mixture 47 years ago, while the ductility of the bitumen was just as good as the day it was laid, which no doubt accounts for the long life of Fort Wayne's oldest pavement."

TO THE EDITOR OF THE AMERICAN CITY:

While reading some back numbers of magazines that I was too busy to read when they arrived, I came upon an article in your November issue, page 63, "A Forty-Seven-Year-Old Asphalt Pavement," by R. C. Heath.

I note that the author states that the penetration of the Trinidad asphalt cement, as used, was 63; and that the penetration of the bitumen now in the pavement, after 47 years, is 55. Thus it is assumed that the asphalt cement showed very slight hardening. Such a statement is far from the truth.

As is well known, Trinidad asphalt cement is high in native mineral content. The apparent penetration as taken upon the cement, fluxed and ready for use, is very much lower than the actual penetration of the mineral-free bitumen of the cement. In this case, with a cement of an apparent penetration of 63, the true penetration of the bitumen was near 100 (more or less), depending upon the flux used.

The instant the asphalt cement becomes the binder in the paving mixture, the mineral, naturally contained in the cement, becomes a component part of the mineral structure. Thus, it is obvious that the apparent penetration of the asphalt cement (mineral present) is not the effective, or real, penetration of the bitumen at all. All asphalt cements will harden some in the mixer, even under proper temperature control and good mixing procedure.

Despite the erroneous conclusion stated in the article under discussion, a very important disclosure could have been profitably stressed. This old pavement has given excellent service, and the penetration of the asphalt binder now in the pavement is 55, a very respectable one. With an original penetration of approximately 100, it now has a penetration that is widely used nowadays as the original penetration of the asphalt, which must undergo some hardening during the manufacture of the mixture as well as that which will naturally occur in service.

For some years now some of us have been pleading for much softer asphalt cements in hot-mix pavements. The reason for the use of softer asphalts is obvious, and this record of a 47-year-old pavement bears out the soundness of our reasoning.

H. W. SKIDMORE.

Chicago Testing Laboratory,
Chicago, Ill.
March 10, 1937.

TO THE EDITOR OF THE AMERICAN CITY:

I am glad of the opportunity of commenting on the letter addressed to you by Mr. Hugh W. Skidmore concerning my article entitled "A Forty-Seven-Year-Old Asphalt Pavement."

It was far from my intention to distort the facts concerning the characteristics of the Trinidad asphalt in this pavement, as is evidenced by the fact that I stated definitely that the penetration of the asphalt cement in 1889 was 63 and that the penetration of the bitumen after extraction was 55, assuming, of course, that it is common knowledge in the paving business that there is no way in which Trinidad asphalt cement with its naturally occurring mineral filler can be extracted from a finished pavement.

Mr. Skidmore is in error in assuming that the penetration of the bitumen in the asphalt cement was near 100. Our experience indicates that the penetration of the bitumen in a Trinidad asphalt cement of 63 penetration would be 80 or possibly slightly less. This would indicate a hardening of 25 degrees or slightly over 30% of the original penetration.

I agree with Mr. Skidmore that softer bitumens can be used advantageously in paving mixtures and offer the superior service given by Trinidad Lake asphalt over a fifty-year period as confirmation.

RALPH C. HEATH.

The Barber Co., Philadelphia, Pa.,
April 5, 1937.

WPA PUBLIC BUILDING CONSTRUCTION

Schools, hospitals, libraries, city halls, warehouses, armories, airport hangars, municipal garages, farm markets, park clubhouses, dormitories, laboratories, menageries, jails, community centers, stadiums, amphitheaters, museums—these and many other types of structures are included in the more than 18,700 public buildings which up to April, 1937, had been constructed, enlarged, or repaired as projects of the Works Progress Administration. On an average, more than 200,000 workers have been employed on WPA public building construction projects during each month of the last year.

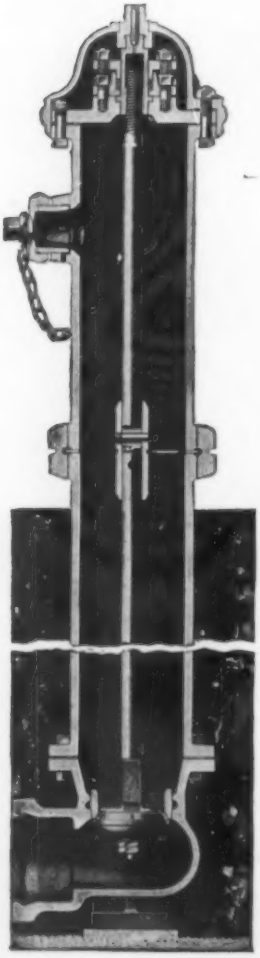
Educational buildings lead the list both in the number of new construction projects as well as those devoted to enlargement or repair; 1,099 new educational buildings have been erected by the WPA, and 7,089 have been improved or repaired, according to figures reported by State WPA Administrators to the WPA's Division of Research, Statistics and Records at Washington. Public buildings housing administrative offices to the number of 2,633 have been constructed or repaired; of these, 594 represent new construction and 2,039 represent improvement projects. Of the 18,784 public buildings of all types on which construction or repair work has been completed, 4,831 were new structures and 13,953 were buildings in need of enlargement or repair.

MODERN FIRE PROTECTION

for modern residential developments

demands

SAFETOP Fire Hydrants



ARE you planning any water service extensions in your community? If so, be sure to specify Kennedy SAFETOP Fire Hydrants—to provide maximum protection to the neighborhood, with minimum hydrant maintenance expense. Kennedy SAFETOP Fire Hydrants meet modern fire service requirements, modern traffic conditions, and modern standards of practical design combined with attractive appearance.

When a fireman carries his hose up to a Kennedy SAFETOP, he can be sure the nozzle caps will drop out of his way, the hose coupling will slip on the nozzle threads quickly, the simple straight-line hydrant mechanism will open the valve easily, and he will receive full main pressure into the hose.

If a truck or automobile side-swipes a Kennedy SAFETOP, the large sturdy standpipe has ample strength to withstand the impact; but in case of a smashing collision, the Safety Breakable Section parts cleanly, protecting the major and expensive parts of the hydrant from damage, and also protecting the occupants of the colliding vehicle from serious personal injury. Breakage of a Kennedy SAFETOP does not result in flooding; and replacement parts cost only $6.00. The hydrant can be returned to service by one man, within half an hour, and without requiring excavating or shutting off the water supply.

These are only some of the outstanding advantages of the SAFETOP—the modern hydrant for modern communities.

The Kennedy Valve Mfg. Co.
Elmira, N. Y.

KENNEDY
SAFETOP FIRE HYDRANT
REG. U.S. PAT. OFF.

Industrial Wastes in City Sewers-II

A Summary Report of the Committee on Sewerage and Sanitation of the American Public Works Association

Pre-Treatment of Wastes

Pre-treatment of wastes for the removal of suspended solids is usually accomplished through the use of settling tanks with or without mechanical sludge-removal facilities. Where the removal of hairy or fibrous matters is involved, stationary or revolving screens may be used. A combination of settling tanks and screens has been found suitable where the removal of both heavy suspensions and fibrous matters has been considered advisable.

Wastes carrying suspensions of high specific gravity, such as those from stone and marble cutting plants and acetylene, carbide and allied works, are susceptible to satisfactory treatment through the use of settling tanks. Because of the high specific gravity of the suspended matters, a high percentage of removal is essential to avoid subsequent sewer deposit.

Tannery beam house liquors have been successfully pretreated initially through changes in beam house practice and subsequently through employing screens, either revolving or stationary, for the removal of fleshings, hair, and hide scraps. Long-established beam house practice involved the use of low-grade lump lime containing perhaps 60 to 80 per cent of calcium oxide, the balance being unburned lime, silica and other impurities which added substantially to the quantity of suspended matters discharged from the vats. The substitution of high-grade dehydrated lime for low-grade lump lime, and the utilization of the vats themselves as settling tanks following the period of hide immersion, accomplished the desired results in so far as adequate removal of the heavier suspension was concerned. The deposits in the vats are removed to the dump, and the supernatant as above noted is given screening treatment.

Pre-treatment of wastes containing free acids such as pickle liquors from steel industries, wastes from engraving plants, metal plating works, storage battery plants and allied acid-waste-producing industries, may be accomplished through various methods of acidity neutralization. When neutralization is impracticable, and the condition in question so warrants, complete diversion of the liquor from the sewer is essential.

Acid wastes, aside from their destructive effects upon construction materials and metal equipment, may, if sufficient in quantity, lower the pH of sewage, thus tending toward offering resistance to its biological treatment. Metallic poisons, such as lead compounds, arsenic, etc., produced by the paint industry, if present in sufficient quantity may tend toward the establishment of a condition of toxicity with resulting retardation of biologic activity. Neutralization or diversion as may best conform to the condition in question obviously should be resorted to.

The tarry wastes from producer-gas plants and coke and gas works have been found to be susceptible to satisfactory pre-treatment through precipitation of the tar-laden water in settling tanks and filtration of the effluent through coke breeze filters.

Removal of Grease

Packing houses and allied industries, such as sausage manufacturing establishments, are producers of substantial quantities of oily, fatty and greasy wastes. The removal of these oils and fats is essential before the liquid wastes are discharged into the sewers, not only because of the unwelcome presence of this material in a sewage-treatment plant, but also because of the tendency for it to adhere to sewer walls, thus reducing the carrying capacity of the sewer, sometimes to the point of complete stoppage. The installation of adequately proportioned grease traps not only results in effectively keeping the greasy substances out of the sewer system, but results also in a source of revenue to the plant owners, who find a ready market for the grease thus reclaimed.

Oils and greases produced at hundreds of automobile service and gasoline stations are very substantial in quantity and would if permitted to enter the public sewer system be an endless source of extreme annoyance. It has been found workable and effective in Milwaukee to have the greases and oils thus produced collected when requested by the Department of Public Works in tank trucks and stored in vats at the municipal incinerator for use in connection with the incineration of garbage. All oil-pit drain connections to public sewers are ordered closed, and city inspectors supervise the work of closing same.

Through the closing of service-station drain-pit connections to the sewers, it is believed that the presence of inflammables, such as gasolines and volatile oils, in the sewers, is to a very large extent removed.

Wastes from canning industries, if appreciable in quantity in relation to the sewage volume into which they are discharged, may substantially increase the composite sewage B.O.D. and resulting cost of sewage treatment. Pretreatment of the wastes in plain sedimentation tanks is effective in reducing its demand for oxygen.

Sulphite Liquors from Pulp Mills

A matter of considerable importance is that of the pretreatment of sulphite waste liquors produced by pulp mills in the paper industry, and in which bio-chemical oxygen demands may exceed, and frequently do exceed, 20,000 parts per million. In municipalities where paper making is a major industry, as in the Fox River and Wisconsin River Valleys in Wisconsin, the matter of discharging a waste possessing such an intense affinity for oxygen into a public sewer system for treatment in a biological sewage-treatment plant is nothing short of appalling and is hardly susceptible to economic justification upon any basis which might be assumed for the purpose of discussion.

The Parking Problem has been the Concern of Authorities for Years - - -

THE solution to that problem is the parking meter at the curb. The driver deposits a coin and is allowed to park until an indicator shows the time to be up.

The Red Ball Parking Meter (patents pending) is an improved type of instrument,—tamperproof, foolproof, and thiefproof, streamlined, sturdy, and rugged.

A fire hose can be turned on it without injury to the mechanism. It is washed clean by the rain. The hottest weather or the coldest does not affect it. It is easy to install without damage to paving. It is accessible for service.

HOW IT WORKS.

The coin mechanism is set to wind the timing mechanism as many degrees as the motorist is allowed to park minutes for his coin. The turning of the lever starts the timing mechanism and when the time is up, the timing mechanism stops and a red ball rises into a glass globe and tells the world, (or that part of it within a block) that the time is up.

ADVANTAGES.

The red ball can be seen from any angle a block away. The chiseler cannot take advantage of the other man's unexpired time, as there is nothing to indicate just when the red ball will come up.

The coin box, amply large for a week's take, has a thiefproof combination lock with a three-number dial.

The Red Ball Parking Meter is the most flexible that has yet been devised. Any time or price arrangement can be set up. Five or more minutes can be given free. Twelve minutes can be given for one cent, twenty-four minutes for two cents, thirty-six minutes for three cents, forty-eight minutes for four cents, or one hour for five cents. The pennies for the time one wishes to stay may all be deposited at one time. Then again, the Red Ball Parking Meter can be set so that for one nickel fifteen minutes, a half hour, or hour may be given, for two nickels, deposited at the time of parking, one may park two hours, or for three nickels, three hours, whatever experience shows to be most desirable.

The last coin deposited is in full view until another coin is deposited to take its place. This effectively prevents the use of slugs.

An automatic counter keeps a check on receipts.

The Red Ball Parking Meter may be installed on a three-to-six-month trial with no expense or obligation on the part of the city except a percentage of the take. Or it may be installed on a rental basis for a longer period for a smaller percentage of the take. Or it may be purchased and paid for by a percentage of the take as agreed upon. Write today for full information.

THE MARTIN TIMING DEVICES CO

21 Besse Place Springfield, Mass.

The Health Department authorities of the state of Wisconsin have intensively studied the question of paper-mill wastes, their effect in stream pollution, oxygen-consumption properties, and effect upon fish life, and have directed as follows (see Special Report of January, 1927):

"(2) With reference to industrial wastes, primary consideration is given in this survey to those from pulp and paper mills. Pollution from the other industries is relatively immaterial and, in the main, such that they can be taken care of with the domestic sewage of the municipalities. With reference to the paper industry, the following program, where not already started, should be initiated without delay:

(a) Equipment for the recovery of fiber wastes so that not more than 0.5-pound of paper-making material per thousand gallons of effluent is wasted, should be installed.

(b) Because the sulphite waste liquor is the greatest factor in reducing the dissolved oxygen of a stream, energetic and continuous research should be carried on to develop recovery processes that will satisfactorily eliminate these wastes as a serious factor in the pollution of streams.

(c) Although not so high in oxygen demand as the sulphite waste liquor, the considerable volume of the sulphate waste liquor makes it necessary that attention be given to improved recovery processes or methods of operation that will eliminate these wastes as a material factor in stream pollution.

(d) In all other branches of the paper industry every effort should be made to so revise equipment and methods that stream pollution will be reduced to a minimum."

Charge for Use of Sewers

Engineers and municipal authorities may be and frequently are confronted with unpleasant tasks involving matters of reconciliation between the extent of pre-treatment desired by them and that which a manufacturer producing an undesirable waste may be willing to subscribe to.

It has been suggested in this connection that charges for sewer and sewage-treatment service to one or a group of manufacturers be determined upon the basis of industrial waste B.O.D. in its relation to the B.O.D. of the total composite sewage of which it may form a part. Such a method obviously might constitute an unwieldy and unsatisfactory tool to apply. The better solution would appear to be that of adequately empowering the proper authorities through legislative enactment to establish and enforce such provisions in the matter of pre-treatment situations as might be considered susceptible to justification upon an equitable and economic engineering basis.

Freeing Cleveland's Streets of Nuisances

THE Citizens League of Cleveland, Ohio, has become interested in the physical cleanliness of the city as well as its moral and political cleanliness. There has been a good deal of trouble in this city, as in others, with the general obstruction of public streets and sidewalks by individuals and firms seeking personal gain through various obnoxious methods of advertising. The League has taken upon itself the task of stamping out these nuisances.

The first battle was waged upon street beggars and peddlers. Many beggars were reaping rich harvests during the depression years of sympathy while receiving relief at the same time. The Chief of Police is doing his best to remove all invitation to this type of miscellaneous and uninformed giving. Pedestrian peddling is also under the eagle eye of the police force, since Cleveland has an ordinance prohibiting it on the city streets and sidewalks.

Another and more serious type of sidewalk interference and misuse is the so-called "Street Action Picture." These men generally go in pairs, one to snap your picture and one to hand you a return card with which to send for your picture at a 25-cent charge. Three serious objections to this practice are: taking pictures of a free American citizen without his consent, littering the streets with return cards, and obstructing traffic. The League pressed the Police Department into ordering these photographers from the streets, following up with the preparation of an amendment to the handbill ordinance prohibiting the "distribution of handbills, circulars, cards, or other advertisements upon the streets of Cleveland, so as to obstruct the free flow of traffic on the sidewalks or streets." Pending action by the Council on this ordinance, the Police Department is keeping the streets free of this nuisance.

One type of street abuse which had grown to real proportions, in which the League's City Committee felt compelled to interfere, was the loudspeaker automobile advertising. For many years the office of the Director of Public Safety issued permits for pictorial and sound advertising on traveling vehicles, until it was pointed out to the present Director that such advertising was specifically prohibited by ordinance and that his Department was not authorized to issue any such permits. The Director immediately canceled all existing permits and instructed the Department not to issue any more, so Cleveland is no longer annoyed to any great extent by this form of advertising.

The League has had vigorous protests from some of these thwarted advertisers claiming interference with their legitimate business. A company which was parading a small man surmounted by an enormous peanut put up quite a fight before this monstrosity was removed from the busy street. The League's Committee has told all the complainants that it is not seeking to hurt legitimate business; that the public streets are for the sole use of the public, and not for private vendors of any kind; that permits for the use of the streets and sidewalks cannot be issued to vendors without seriously impeding traffic; and that the city owes a protection to the legitimate merchants on the main streets, who pay rent and taxes, by keeping irresponsible vendors and advertisers off the streets.

These uses and abuses of the streets point to the need of a new street code establishing more specific regulation governing the use and condition of the streets and sidewalks. The League's City Committee is undertaking the task of working out such a comprehensive ordinance with a view to urging its inclusion in the revised municipal code, in preparation by the City Council and the Law Department. Also in connection with the problem of downtown congestion, the League has promoted the use of parking meters.

Exempting Homesteads from Taxation

IN the *Journal of Land and Public Utility Economics* for May, 1937, "The Status of Homestead Tax Exemption in the United States" is the title of a valuable 8-page article by Alonzo B. May, Assistant Professor of Economics of the University of Denver. Defining homestead tax exemption as "a policy of the state to remove from the tax rolls either all or a part of the assessed value of the taxpayer's legal and declared homestead," Dr. May discusses the experience of Florida, Louisiana, Mississippi, Texas, Minnesota, and Oklahoma, and summarizes his conclusions as follows:

"The flood of bills providing for homestead tax relief which have inundated our legislative assemblies for the last two or three years clearly shows that homestead tax exemption is not an ephemeral phenomenon. There is little doubt that the general property tax is in dire need of reform. Homestead exemption laws have arisen out of that need. These measures, however, will not obviate but may actually increase the inequities present in the tax. The real remedy lies in a reappraisal of the role of the general property tax in our tax system, in the integrated administration of the assessment and collection routine, and in the replacement of 'rule-of-thumb' approximations in property taxation by scientific precision."

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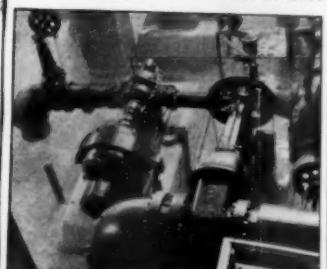

NEW YORK CITY, May 14—The easiest way to solve the inventory problem for valves and valve parts needed to maintain a water or sewage system is to standardize on Crane valves. Parts are instantly interchangeable because of extremely accurate gauging and rigid inspection. Duplicate sizes are avoided, and responsibility for service is focused in one spot.

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Sewer Connections— A Health and Financial Problem

Ways and Means of Protecting Community Health by Requiring All Property to Be Connected to the Sewer System

By H. E. HARGIS
State Department of Health, San Antonio, Texas

THE value of universal connections to city water and sewage facilities outweighs any cost of making or maintaining such facilities. Public health work is primarily educational, and its purpose is the creation of a demand for sanitation. Law enforcement plays a very minor part and should be secondary to an educational campaign.

Before any attempt is made to enforce an ordinance requiring sewer connections, the interest of the people of the city should be stimulated to such an extent that public opinion will demand compliance. Any law or any ordinance backed by strong sympathies of the people will enforce itself.

Campaign for Public Sentiment

A campaign to stimulate public interest in sanitation in general and universal sewer connections in particular should include:

1. Talks by city officials, and especially the city health officer, to civic clubs, parent-teachers associations, Boy and Girl Scout meetings, service clubs and others on the cost of diseases spread through insanitary facilities in the community, and the dangers of epidemics.

2. This should be followed by the appointment of committees among these groups to work out plans for civic improvements, with particular emphasis on getting rid of the surface toilet.

3. Meetings with the plumbers should be held to secure their cooperation in the work, and in all probability they will be able to make special rates to those connecting to the sewer within a given period of time. The Home Owners Loan Corporation should be consulted in regard to financing plumbing installations, and arrangements should be made for this method of financing if possible.

4. Newspaper publicity, and, if possible, editorial comments on the value of sewer and water facilities to the community.

5. Chamber of Commerce cooperation through its members, on the trade value, as well as the esthetic value, of having the town completely sewered.

This campaign should then be carried on by having the local health department or sewer department representatives call on those persons affected, to secure sewer connections as rapidly as possible. After preliminary work of this type, enforcement may follow to bring the remaining property owners into line.

A Special Campaign

There are other methods of securing sewer connections. One unusually interesting campaign started with the taking of photographs of the alleys, showing the open toilet and at least part of the home. These photographs were placed on exhibit in a prominent place, with a large sign underneath, "Can You Identify These Houses?" The interest caused by the series of photographs was remarkable, and in a very short time there was considerable activity toward correcting these conditions, and connections to the sewers followed.

Too much emphasis cannot be placed on the value of an organized campaign with groups of representative citizens participating in the work.

San Antonio Regulations

During 1936 San Antonio built over 20 miles of sanitary sewers with WPA labor. In this period the city obtained 1,437 sewer connections, which is a remarkable record. Sewer connections continue to come in at the rate of about 200 a month, and at present, with a city of 260,000, there are 45,457 sewer connections, and about 8,000 yet to be made.

The city of San Antonio passed an ordinance late in 1936 that has done much towards speeding up sewer connections. Its high points are that it provides a penalty for persons who reside, congregate, or are employed in a building not connected with the sewerage system, or not having a septic tank meeting the requirements of the State Health Department, or a pit privy meeting the requirements. If within 200 feet of the sewer, they must be connected; if beyond this distance, by permit issued by the City Health Department, they can construct a septic tank or a pit privy. The pit privy must meet the minimum requirements as set up by the U. S. Public Health Service and the State Department of Health for the construction of WPA privies. The ordinance also provides that these facilities must be maintained in working order and in good repair at all times.

In securing sewer connections, the plan followed by most health departments is to wait until a complaint is received from some of the neighbors and then take this complaint up with the property owner. If he refuses to remedy the conditions, a complaint may be filed in the city court. Another practice is to secure applications for sewer

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connections before the extensions are built. Unfortunately, most cities cannot or do not force connections, even after the property owner has petitioned the city for the construction of the sewer extensions.

The San Antonio campaign is working very successfully. The sewer connections are being made systematically. Starting with one section of the city, the inspectors have worked each block, looking up the owner, and giving him notice to connect to the sewer. A second notice is given after a reasonable period; and unless connection is made a complaint is filed in court.

Small Property Owner a Problem

One of the difficulties found in all cities is the small property owner who probably has an income of $30 a month, owns a small two- or three-room house not worth more than $200, and who is on the sewer line but has no inside plumbing fixtures. This man can be brought into court, tried and fined. This does not alleviate the situation, because he actually does not have the money to make the connection. One method suggested has been the outside flush or frost-proof type toilet, as it is sometimes called, which is located on the alley in the present building used as an open toilet. The minimum cost, even for this type of fixture, is about $45, and very few agencies will carry the credit on a case of this type. The Home Owners Loan Corporation does not like to finance small installations of this type, and the credit of the applicant must be considered. This is by far the biggest problem in securing sewer connections today.

Areas Outside City Limits

In every city there are areas not covered by sewers, and sometimes these are outside the city limits. From an economic standpoint, as well as a public health standpoint, these areas are just as important as the best residential section within the corporate limits.

The method which I would suggest for securing sanitary conditions in these outlying districts is particularly applicable to Texas but may be useful in other states. The State Department of Health of Texas has an approved project for the construction of pit-type toilets in practically every county in the state. The utilization of this project, however, is dependent on the interest taken by the cities and towns in carrying out sanitation programs. One method of going ahead is to secure a project by requesting the assistance of one of the district supervisors from the State Department of Health, and building sanitary toilets outside the sewer area. This construction can be financed either by the individual property owner or by the city. When the city finances these, it purchases all materials and sets up a central construction plant to build the concrete slabs and the privy houses. These are shipped out to the locations, the pits dug and the toilets installed. There is no cost for labor on these projects, because the labor is furnished by the WPA.

A number of cities have taken advantage of this by appropriating about $20 for each unit, which is the cost of the materials, and charging a rental fee to cover this cost. A rental fee of about 50 cents a month will pay for the toilet in about three or four years, and leaves a fund for inspection and maintenance. If the property owner wishes, he may purchase the unit outright from the city and not have to pay the rental charge.

The advantage of this program is that it provides uniform construction at a very low cost, and municipal control over these sanitary facilities. About 80,000 pit-type toilets have been built under this or similar plans in the last two or three years. This is an ideal way to take care of the suburbs and the areas in the city where sewers are yet to be laid.

ACKNOWLEDGMENT.—From a paper presented at the Nineteenth Annual Water Works Short School, Austin, Texas.

Many New Facilities for Cleveland's Largest Park

EMPLOYING a daily average of more than 300 men, Cleveland's Woodland Hills Park development project is one of the outstanding Works Progress Administration operations in the field of recreation facilities in Ohio. Work on this project, begun in October, 1936, is scheduled for completion early in July of this year, after more than eight months of work. The overall cost of the park's improvement is $308,000, of which the WPA is contributing $291,000 and the city of Cleveland $17,000.

Woodland Hills Park is located in a densely populated middle-class residential district in the southeast section of Cleveland. It is the largest park in the city, embracing 140 acres. The average summer Sunday crowd attracted to the park numbers about 25,000. Two or three times during the year on special occasions as many as 100,000 people come to this park.

The major work being done by the Works Progress Administration includes:

Construction of two new indoor baseball diamonds in the "south of Kinsman" area. These will be built for winter flooding to make an ice-skating pond.

Construction of two new clay tennis courts in the "south of Kinsman" area.

Construction of a new office and service building to replace the present wood shack. This will be a one-story brick L-shaped structure 111 feet long, with garage, storage space, blacksmith shop, carpenter shop and paint shop.

Construction of a new football field in the "north of Kinsman" area and a new running track to encircle the field.

Relocation of eight baseball diamonds to eliminate poor drainage conditions. A 20-foot boulevard to encircle these baseball diamonds.

Complete development of the area just east of the reservoir, which is now a tin-can dump, 8 feet lower than the surrounding park. Six tennis courts, four indoor ball diamonds, and two soccer fields are being built in this reclaimed dump area. Winter flooding facilities are being built here also to make a large ice skating rink.

Drainage and grading of a low pond in the north section of the park and construction of a parking lot, a children's playground and a picnic area on this reclaimed land, which covers about five acres.

General landscaping work is being done throughout the park, including the planting of 6,300 trees and 22,500 shrubs.

About a mile of sewer pipe is being laid, and almost three miles of drain tile. In addition, WPA work on this project includes thousands of square feet of new lawn, construction of retaining walls, ornamental entranceways, and stone steps.

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The Crime Laboratory Comes of Age

By LIEUT. GEORGE W. SCHATTLE
Cincinnati Police Department; Director, The Institute of Legal Medicine

THE use of scientific methods in crime detection is still sufficiently new to inspire the press to an occasional spectacular story of uncanny success in the identification of certain shrewd criminals. But only a few cities and other governmental agencies yet possess adequate facilities or organization for the conscientious application of scientific methods of criminal investigation in the daily routine. The question still remains: "When you try mixing police and science, what do you get?"

As one answer to this question, Cincinnati's Institute of Legal Medicine (in which the police crime laboratory and homicide squad are integrated) furnishes significant case history. Organized in October, 1934, it now has two years of routine work on a practical scale to its credit. Operating on a conservative budget, it has had to justify its existence even when the criminals lacked the kindness to leave the type of clue for which scientific methods are required. Its records during the period provide a reasonable evaluation of the place of the scientific approach in a practical day-by-day job alongside the regular detective staff and the policeman on the beat.

Here is one outstanding item in the record. During the year 1935, 67 Cincinnati murder cases were investigated by the science-minded homicide squad. *Sixty-five of these were cleared by arrest. In the other two cases, the crime has been solved and the culprits are known!* Of course, no strict dividing line can be set up between the crimes solved by virtue of the laboratory's existence, and those that might have been solved in any case. Generally, our laboratory efforts have been a contributing factor in obtaining indictments, confessions and convictions when combined with conventional police work. But in the six or seven of these that might otherwise have gone unsolved lies the real justification for our work.

Cincinnati's so-called "Barrel Murder Case" is an example of the "extra increment" that has carried some of the more difficult of these cases to a successful conclusion.

At 2:00 A.M. on the morning of November 25, 1934, a barrel containing the nude body of a man was found in a garage in a Cincinnati suburb. As in all murder cases, the laboratory's homicide squad was immediately called to the scene. Witnesses told us that a man had called at this address about midnight, asking to rent a garage. After he had removed the barrel from the rear of his car and left it in the garage, he disappeared. None of the witnesses had ever seen either the barrel-toter or the murdered man before.

The barrel and its contents were removed to the county morgue. Then came the grim job of removing the cadaver, showing a bullet wound in the rear of the head. After the body was removed, we took the remaining paraphernalia to the laboratory, and a scientific examination began. A fly screen that was placed over the top of the barrel received our first attention. Examination under the ultra-violet light revealed that this screen had an abundance of animal and vegetable fats throughout the interspacing of the mesh, and we concluded that it had been used to cover a window or ventilating fan for a restaurant or kitchen.

The next object that received our attention was a pink and white cloth which we thought was a light cotton blanket. Ultra-violet light, however, showed coffee, milk and bread stains, so it had probably been used as a table cloth. A white sheet gave no reactions other than that of blood stains. The pillow slip, however, divulged a faded laundry mark, which, under the ultra-violet light, could be identified as the name "Merz." The improvised coffin gave a brown fluorescence under the ultra-violet lamp with a peculiar reaction between two of the staves. Upon closer examination the object of this purple reaction proved to be a tiny piece of lettered tape, such as used by merchants to tie packages. This lettering proved sufficiently legible under laboratory technique to yield the name of R. J. Merz, jeweler, of Columbus, Ohio.

THE AUTHOR USING A PORTABLE X-RAY MACHINE, MAINTAINED PARTICULARLY TO EXAMINE SUSPICIOUS PACKAGES
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Two detectives were immediately sent by automobile to Columbus, Ohio, 110 miles from Cincinnati. Shortly after their arrival, they discovered the scene of the crime and the window from which the fly screen had been taken in an alley behind the jewelry store.

Once the scene of the crime had been located, murderer and victim were easily identified, and the crime was easily broken. The victim was a jewelry auctioneer, Alvin A. Brunner, who had been engaged to auction the stock of the Merz store. He had been murdered by his assistant, Joel S. Berman, with $19,000 worth of diamonds as the motive. Their business in Columbus had been completed so that no suspicion of foul play had arisen at the scene of the crime.

Here, however, was the startling fact that would defeat at the outset any "logical" analysis of the crime: Having committed the murder undetected and successfully disposed of the victim's clothes, why had the murderer placed the body in a barrel, tied it to the back of his car, and transported it over a hundred miles from Columbus, past miles of dark and desolate roadside where it could easily have been disposed of,

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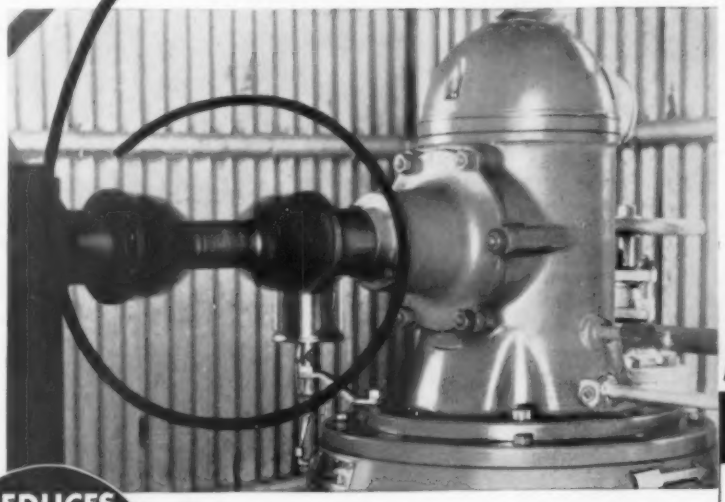

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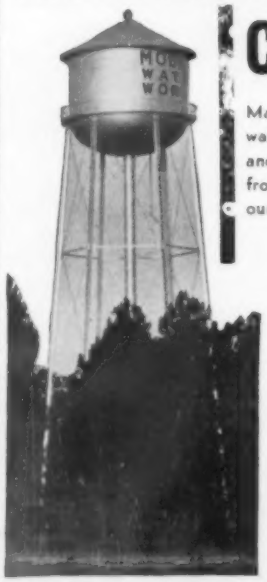

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to a busy Cincinnati suburb where early discovery was almost inevitable? Ordinarily, days might have been spent trying to locate the murder scene and establish the identities here in Cincinnati. In less than four hours, however, the scientific approach, with the help of the ultra-violet lamp, showed the futility of such reasoning from incomplete evidence.

As a matter of fact, the real reason for the illogical barrel-ride lay in the religious beliefs of the murderer who wanted the victim to be quickly discovered and buried.

This is only one example of the achievements of the laboratory. This Institute of Legal Medicine, as organized under the leadership of Cincinnati's Safety Director and other prominent local officials and citizens, operates in conjunction with the Police Department of the city, but not exclusively as part of it. Its services are available to county officials and other criminal and civil law-enforcement bodies. Its functions, as determined by the board of directors, which includes the Safety Director, heads of the municipal hospital staff, the Dean of the Law School and other local officials, are the following:

1. To collect, preserve and present evidence to the courts in criminal cases.
2. To expedite the solution of major crimes and a speedy apprehension of the criminals.
3. To instruct and teach law-enforcement officers, students of public administration, legal and medical students, in all branches of police science and criminal investigation.
4. To conduct research along lines that will benefit and assist criminal investigation.

The laboratory quarters are located in a section of the Cincinnati General Hospital. An endowment of $5,000 from a private source made possible the purchase of initial equipment and supplies. Operating expenses and personnel are furnished by the Police Department. At present, the personnel is composed of four detectives, who also constitute the homicide squad of the Police Department, and the Director of the laboratory, who also serves as Lieutenant in charge of the homicide squad. All have had practical experience in the uniformed force in addition to scientific training in such special fields as ballistics, microscopy, ultra-violet ray and X-ray technology, micro-photography and the use of the polygraph (lie detector). The consulting staff of the laboratory also includes medical specialists affiliated with the General Hospital, and scientists, chemists and others affiliated with the University of Cincinnati.

Equipment of the Cincinnati Crime Laboratory

Acquired at a cost of approximately $2,500, the equipment comprises one of the most modern and complete groups of scientific aids to justice to be assembled by any local law-enforcement agency. Perhaps our outstanding piece of equipment from the standpoint of its fields of usefulness, present and future, is the Uviarc light source used so successfully in the previously described "barrel murder." This is a quartz mercury-vapor tube of high ultra-violet output. Equipped with special filters which cut down the visible light transmitted to little or nothing as required, the unit is used to reveal characteristic fluorescence effects highly valuable in identification work.

The "black magic" of this invisible light has specific application in the case of forged and altered documents, and in the revelation of writing in invisible ink. Differences in the fluorescence characteristics of stains on clothing, rags, paper and the like also frequently provide invaluable information, most body fluids being easily distinguished both among themselves and from other types of stains. Occupational stains, due to the cutting oil used by a machinist, for example, are frequently valuable for identification purposes. On the human body itself, dyed hair is easy to detect under ultra-violet, and certain skin diseases and other abnormal body conditions are more readily revealed. The peculiar fluorescence of the hair of a suspect who had acquired an addiction for aspirin proved the clue necessary to establish his connection with a certain murder case. Recently, too, commercial laundries have been forsaking the familiar printed laundry mark for an "invisible mark" printed in fluorescent ink which appears only under specially filtered ultra-violet light sources, mounted over the laundry sorting table.

The identification of firearms and bullets, and the determination whether a particular bullet was shot from a particular gun, call for a combination of scientific equipment and personal skill in its use. A comparison microscope equipped for photomicography, a helixometer, a firing box and a reference collection of all types, makes and calibres of ammunition made in the United States, are available in the laboratory. X-ray equipment for the examination of suspected bombs, metal objects in closed containers, small caliber bullets in cadavers, and the like, is kept instantly available in the form of a compact portable unit. It provides a highly convenient supplementary unit to standard medical X-ray equipment available through the consulting staff of the hospital.

That highly controversial scientific crime weapon, the polygraph, or lie detector, has given a good account of itself in our work. In no case did the lie detector indicate either guilt or innocence definitely at variance with facts proved beyond a reasonable doubt.

In its capacity as Cincinnati's homicide squad, the laboratory staff has primary jurisdiction, under the chief of detectives, for all deaths occurring under questionable circumstances. Bodies or surroundings must be left undisturbed until the arrival of a member of the squad, and the local county coroner accepts our findings so far as matters subject to scientific investigation are involved. In addition, the staff is continually at the service of local law-enforcement bodies with respect to lesser crimes—forged documents, thefts, identification of hit-and-run automobiles, etc.

When there is no immediate case afoot, the laboratory staff spends its time instructing detectives and patrolmen in the possibilities of science as a crime weapon. In addition, research of a fundamental character that gives promise of expanding science's service in law enforcement is continually under way. During the past year, research of this kind has been carried on in the identification of hair. This work has now progressed to a point where it is possible to state from a given specimen of hair the approximate age of the subject, the portion of the body from which it was removed, whether it fell out or was removed by force, and approximately the last time the hair was cut. The big remaining factor is to prove beyond reasonable doubt the fact that a strand of hair must have come from one particular subject. Other fundamental research on the specific characteristics of tobacco and ash, whereby the brand of a cigarette butt and the length of time since it was smoked can be definitely established, has also been accepted as a problem worthy of further study. In fact all the "mays" and "mights" in the field ahead of the science-minded law-enforcement agency are enchanting. But in the meanwhile it is best to emphasize again the present practical usefulness of such weapons as the camera, the comparison microscope, the X-ray and the ultra-violet lamp. In the hands of those properly trained in their use, they stand today as great a threat to the criminal—particularly to the shrewder criminal—as do all the older methods which have arisen since Cain inaugurated the first crime wave.

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Municipal Accounting Standards

By LLOYD MOREY
Comptroller and Professor of Accountancy,
University of Illinois, Urbana

THERE can be no question as to the value and importance of good accounting and financial reporting in public affairs. They are essential for every business, whether large or small, but in government they are of even greater importance because they must be depended upon to provide essential information for proper administration and to prove the integrity and efficiency of those upon whom the responsibility of government has been placed. We cannot expect to have responsibility in government without accountability. The two are inseparable and go hand in hand.

The past few years have witnessed a determination of the fundamentals which, when generally accepted, will result in materially improved accounts. I refer particularly to the work of the National Committee on Municipal Accounting.

The difficulty with most accounting programs in the past has been that they have started in the wrong place. They have assumed that uniformity and usefulness of accounting could be secured by the use of certain kinds of ledger sheets or bookkeeping machines or other mechanical devices. The present movement begins with the premise that the purpose of accounting is to produce information; that financial reports are the most important product of the accounting system, and that the system must be so designed as to produce the right kind of reports.

The latest and most important volume which the Committee has published, and which should be in the office of the accounting officer of every municipality in the country, is entitled "Municipal Accounting Statements," issued August, 1936. It can be secured from the National Committee on Municipal Accounting at 850 East 58th Street, Chicago. This volume presents the underlying principles of accounting recommended by the Committee after careful consideration, forms of financial statements for a municipality, and definitions of the principal terms used in municipal accounting. All this material is the result of extended study and revision, and represents, in my opinion, the most useful and important contribution to the literature and practice of municipal accounting which has yet been produced.

One Officer Should Handle Cash

Departments sometimes prepare and issue financial reports. This is rarely, if ever, desirable. The only exception that I would recognize would be in a municipally operated utility where the accounts of the utility are kept in the proper manner on an accrual basis and in the office of the utility. Even in this case the accounts and reports should be under the jurisdiction of the general accounting officer of the city and should be coordinated with his control accounts. In all other cases the city clerk or comptroller should be the only officer who prepares and issues financial statements.

The second important principle is: "The general accounting system should be on a double-entry basis with a general ledger in which all financial transactions are recorded in detail or in summary."

It should not even be necessary to mention this elementary principle of good bookkeeping, yet the number of public agencies at the present day in which this first essential is missing is so great that it must be kept continuously before us. The financial condition of an enterprise can be set forth only by the preparation of a balance sheet in which all its resources and obligations are stated. Such a balance sheet can be accurately and easily prepared only from a ledger kept by double-entry in which these facts appear. The condition of a municipality cannot be determined by the cash balance in its treasury or in any given fund. Other facts which must be taken into account are the amounts of outstanding and uncollected taxes, the amounts of other receivables outstanding, and of unpaid bills, encumbrances in the form of orders or contracts for which bills have not been received, and unencumbered appropriation balances which may yet be expended. These are only a few of the items which must enter into a statement of the financial condition of the municipality to make it complete. The information on these matters, as well as on other matters relating to the fixed assets of the city, its bond indebtedness, and many other items, can be accurately accounted for only through a general ledger kept on a double-entry system and in accordance with the recommendations of the National Committee. Only the smallest and simplest village can safely operate without this important record.

Funds Should Be Kept Separate

The next principle set forth by the Committee, and, in many respects, the most important principle, as well as peculiar to municipal accounting, is: "The accounts should be classified in balanced fund groups." The classification of accounts and of financial resources by funds is of fundamental importance in municipal administration.

Whenever a separate tax levy is made, a separate fund is created. The problem is particularly acute with respect to special assessment funds. The collections of every installment of each improvement constitute a distinct and separate fund. Certain bonds or vouchers are payable solely out of the receipts from that installment. They are a lien upon its receipts, but not upon anything else. The accounts should show clearly at all times the amount collected, the amount outstanding and uncollected, and the amount of bonds or vouchers outstanding and payable out of each installment of each assessment. If this principle of bookkeeping and financing had been followed out in Illinois in the last ten years, Illinois cities would not be in the embarrassing position they are in at the present moment with respect to their special-assessment funds.

CLIFFCHAR

ACTIVATED CARBON

•

A SPECIAL PRODUCT FOR PURIFYING WATER

The experience of leading municipalities confirms the advantages of CLIFFCHAR as an agent for removing objectionable taste and odors from water supply.

CLIFFCHAR, an Activated Carbon of the highest type, is processed only from selected hardwoods in a plant devoted exclusively to wood chemicals. Through rigid control of every step of production, its high quality and uniformity are definitely assured.

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CLIFFCHAR "R"

A SPECIFIC GRADE FOR WATER PURIFICATION

In properties, size and density, CLIFFCHAR "R" is specially suited to treat water.

Low phenol value, as shown by standard phenol tests, indicates exceptional ability to remove phenolic and similar compounds.

Extreme fineness (99% passing a 325 mesh screen) gives maximum surface exposure with greatest possible absorptive quality.

Controlled and uniform density assures suspension period long enough to take full advantage of its high absorptive ability, yet completely settle out in ordinary settling basins.

The density of CLIFFCHAR is such that, with normal lengths of settling time, a minimum of carbon passes to the filter, giving proportionately longer filter runs.

We are glad to furnish additional information, or to report on specific questions. Your inquiry involves no obligation.

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PLAIN CAST OR SPUN CENTRIFUGAL

Cast Iron Pipe and Special Castings, Bell and Spigot, Flange, Flexible Joint, Culvert, Milled and Plain End Tubes, Cylinders, Flanged and Bell and Spigot Fittings, High Pressure Fire Service Pipe, Warren Short Body Specials, Threaded End Pipe.

Size 2 to 84-inch

Pipe manufactured in accordance with standard specifications adopted and approved by water works associations and engineers.

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MURDOCK *Outdoor* BUBBLE FONT

Popular with Boards of Education, Park Supts., Waterworks Supts., Health Officials and Recreational Directors, because it is

TROUBLE-PROOF

Will not freeze — Will not rust
Self-draining — Non-squirting
Lowest upkeep cost

Modern type bubbler extends well above rim of basin so latter may overflow in case of drain stoppage.

If you desire to modernize old Murdock fountains, write for complete information to

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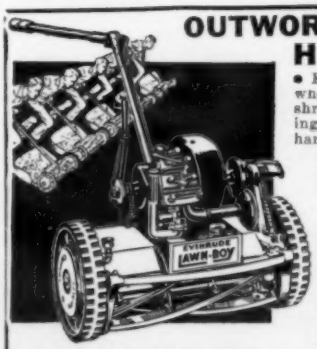
Cincinnati — Since 1853 — Ohio

Approved by Over 900 Cities

OUTWORKS 3 TO 5 HAND MOWERS



• For park and boulevard lawns—where trees, walks, flower beds and shrubs make ordinary power-mowing slow and difficult—the "one-hand" EVINRUDE Lawn-Boy outworks 3 to 5 hand mowers and does a better job!

Cuts 18" swaths, works 6" closer to trees, etc., than most hand mowers, trims steep terraces easily and its light weight won't pack or tear soil. Rubber tires, 4 cutting heights, automatic control of starting or stopping through one-hand movement of handle grip. Only $110 f.o.b. factory; easy terms. Prices subject to change without notice.

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EVINRUDE LAWN-BOY

The next principle emphasized by the Committee is that a clear segregation should be made between accounts relating to current assets, liabilities and operations and those relating to fixed assets and liabilities. Asset accounts for permanent property not available to meet expenditures or obligations should be segregated from other fund assets, and the equity represented by them not included in the current surplus of any kind.

Budgetary Control

Another fundamental principle is: "The general accounting system should include budgetary control accounts for both revenues and expenditures."

The budget is the heart of the financial operation of any government and is a part of the cycle of records which includes the budget, the accounts, and the reports. The classification of accounts for these three records should be uniform so that they will present a continuous financial picture.

The budgetary accounts deal not only with revenues and expenditures, but also with revenue authorizations, appropriations and encumbrances. These accounts are necessary in order to provide adequate control of budget operations. This control can be fully exercised only when the accounting system provides for a record of every source of revenue from the time it is created until it is collected, and for every expenditure from the time the obligation is incurred through a purchase order or contract until payment is finally made.

Another very important part of the financial system is the independent audit. Irrespective of the completeness of the accounting system or internal check, an examination by a competent, independent, outside accountant is essential.

The method of selection of auditors for municipalities at the present time is often very unsatisfactory. Auditing is professional service. It cannot be satisfactorily engaged on a basis of competitive bidding and award to the lowest bidder. An auditor should be selected after inquiry to determine the person best qualified for the work.

Autonomy

In many states the supervision of local accounting has been placed upon some central state agency. If local bodies fail to establish the proper method of accounting, then state supervision is the only way out. A much better way, however, is for the cities themselves, both individually and through the municipal leagues, to take the initiative and adopt recognized standards of accounting practice and apply them in their individual places. Through this method, the cities are able to set up an accounting system best suited to their own needs and at the same time to meet accepted standards. They are not required to come under the direction of some central state body which may make arbitrary requirements not taking into account the peculiarities of local conditions.

There was a time when city accounting officials could offer as an excuse for inadequate accounting the fact that recognized standards in this field did not exist. Such an excuse is no longer valid.

Do not be misled by the will-o-the-wisp, simplicity. A complaint is made against municipal accounting systems that they are too complicated and that they cannot be understood by the average person. Municipal finance is necessarily complicated. It lacks the simplicity of the average private business. Where many funds are involved, each of which is a separate fiscal entity and requires different methods of treatment to express the results and conditions in a few figures, the accounts as well as the financial statements must have a certain degree of intricacy, otherwise they are incomplete and inaccurate. Only by letting the council, officials and citizens know of this fact and by giving them suitable explanations of the conditions surrounding the various funds can we deal with this important problem in an adequate manner.

From an address before the Illinois Municipal League convention.

Expanded Activities of Harvard Bureau for Street Traffic Research

Fifteen Fellowships Available

MILLER McCLINTOCK, Director of the Bureau for Street Traffic Research of Harvard University, announces the availability, beginning September 27, 1937, of fifteen $1,200 fellowships to persons with an A.B. degree and not over 35 years of age. Students who are awarded these fellowships will be required to take two basic courses in street and highway traffic control as well as two specialized traffic courses or two approved collateral courses. Applications must be upon forms obtained from the Bureau for Street Traffic Research, 29 Holyoke Street, Cambridge, Mass., and must be filed promptly. Former Fellows of the Bureau now hold many positions in the field of traffic control in Federal, state, and city governments and in private organizations.

Research Studies Completed

Completion of twenty-five research studies on problems of highway engineering, enforcement, traffic control, public education and related subjects is announced by the Bureau for Street Traffic Research of Harvard University. "The research projects completed furnish definite contributions to our knowledge of the many-sided motor traffic situation," Maxwell Halsey, Assistant Director of the Bureau, declared.

Street Cars in 397 Cities of Over 10,000 Population

IN the discussion of "The Local Transit Problem" in the May issue of THE AMERICAN CITY, it is stated that "Only 62 cities now operate trolley cars." According to *Transit Journal's* records, which we keep closely up to date, there are 397 cities with trolley service among the 982 cities of more than 10,000 population in the United States.

Our classification of cities over 25,000 population shows the following situation with respect to transit service:

	All Rail	Rail & Bus	All Bus	No Service	Total
Cities over 500,000.....	0	13	0	0	13
Cities 100,000—500,000.	1	62	17	0	80
Cities 25,000—100,000..	25	127	127	4	283
Total	26	202	144	4	376

Among the 606 cities between 10,000 and 25,000 population, our records show 169 with trolley service. The determination of this figure involves somewhat more interpretation than do the figures for cities over 25,000 population, as a question sometimes arises as to the extent that through trolley lines render local service. Regardless of all matters of interpretation, however, it is safe to say that between 300 and 400 cities have trolley service.

JOHN A. MILLER,
Editor, *Transit Journal*, New York.

EDITORIAL NOTE.—Following mention of the number of all-bus cities, it was stated on page 7 of the May issue that "Only 62 cities now operate trolley cars." This figure was intended to refer to the number of all-rail cities of 10,000 population or more. Trolley cars either exclusively or in combination with buses are operating in nearly 400 cities, as Mr. Miller says.

SPARLING MAIN-LINE WATER METERS

ACCURATE
ECONOMICAL
DEPENDABLE

Velocity type; direct registration. Easily and quickly installed anywhere in the line.

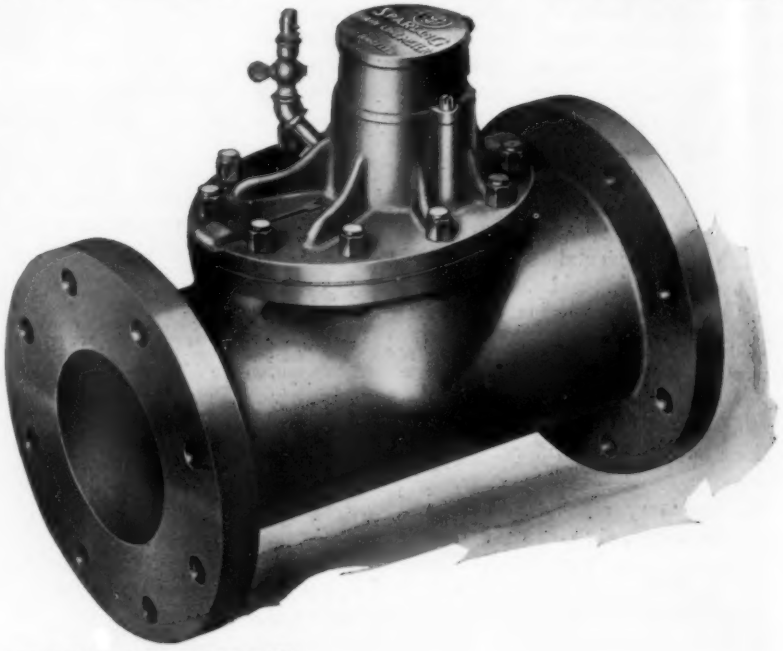
Thousands in use in municipal water works, sewage plants, railroad, oil fields, paper mills and other industries.

Sizes from two inch to sixty inch —or larger—to fit any main-line metering requirement.

Extremely low loss of head results in power savings.

Auxiliary Indicators and Recorders furnish ink records of hourly, daily and weekly flow.

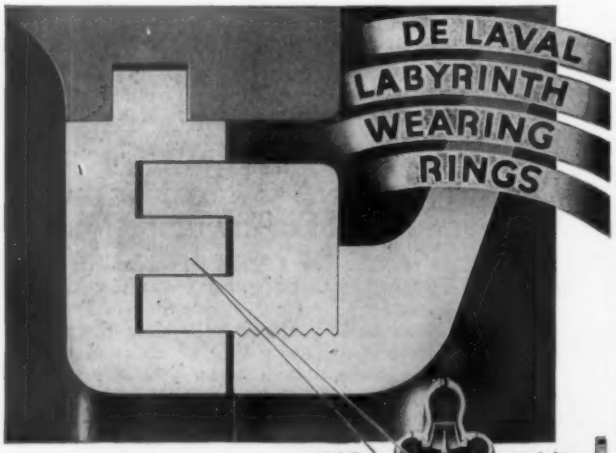
Descriptive literature will be sent at your request.



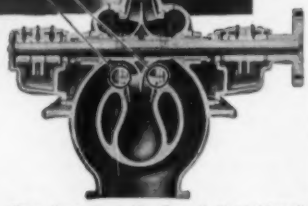
SPARLING

WATER MEASURING EQUIPMENT

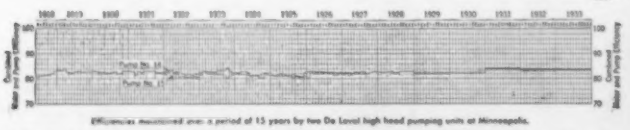
LOS ANGELES	CHICAGO	CINCINNATI	NEW YORK
945-951 N. Main St.	3104 S. Michigan Ave.	622 Broadway	101 Park Ave.



- The most notable development in centrifugal pump design;
- Sustain efficiencies for years without repair or overhaul expense;
- Hold leakage to a minimum, while permitting relatively large mechanical clearances;
- Reduce wear because of both the lower velocity of flow and the greater initial clearance;
- Made to limit gages and easily renewable;
- No finishing cut required on impeller ring after mounting;
- Save replacing impeller or reboring casing.

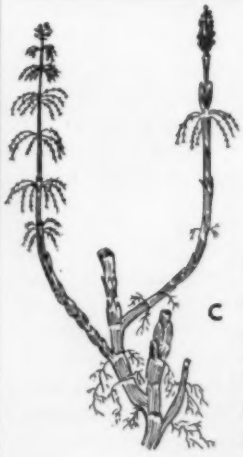


The fact that De Laval Centrifugal Pumps sustain their high efficiencies for years makes them a most profitable investment. Official records of tests and maintenance costs substantiating this statement are given in Catalog E-1166, sent upon request.



Efficiencies maintained over a period of 15 years by two De Laval high head pumping units at Minneapolis.

DE LAVAL STEAM TURBINE CO., TRENTON, N. J.



KILLS HORSETAIL

HORSETAIL is tough—but not tough enough to stand up against Dolge Weed-Killer. This chemical is so powerful that a 1-to-20 solution completely kills not only horsetail, but also wild morning glory, crab grass, burdock, thistles, nettles and other hardy growth—even poison ivy gives up the ghost when Dolge Weed-Killer is applied according to simple directions. Of course, ordinary growth stands no chance at all. A 1-to-40 solution drives it off your drives — off walks, gutters, tennis courts, sand traps, baseball infields, running tracks.

DOLGE WEED-KILLER

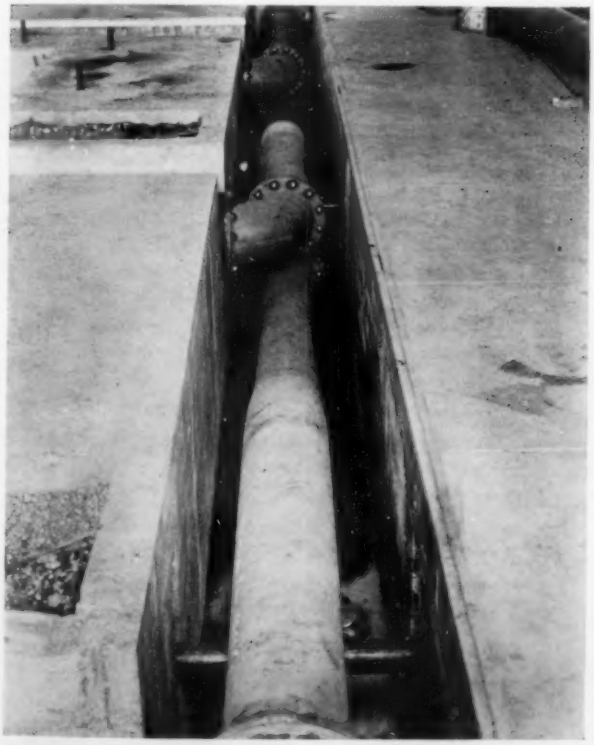
The C. B. Dolge Co. Westport, Conn.

New Diesel-Electric Plant at Tipton, Indiana

AFTER ten years of purchased energy, and municipal steam operation prior to that, the city of Tipton completely remodeled its 40-year-old plant, installing three 700-hp diesel engines. The plant was placed in operation August 1, 1936, and is expected to save the city $35,000 from the cost of the purchased power and pay for itself in ten years.

The engines are 8-cylinder, 4-cycle Wintons direct-connected to 485-kw, 2,400-volt 3-phase 0.8 power-factor 60-cycle alternating-current generators with direct-connected exciters built by Electric Machinery Manufacturing Co. Each engine has its individual cooling system, consisting of heat exchanger and oil cooler of the shell and tube type, with its own raw- and soft-water pumps. The temperature of the discharge water from the engine is controlled by thermostatic valves on the raw-water side of the heat exchanger. The quantity of water which circulates around the engine is unvaried. The raw-water side of the exchanger is automatically controlled to give the jacket water from the engine uniform temperature throughout the range of load.

The small amount of make-up water required for the circulating system is provided by a specialized softener feeding direct by manual control to each of the three circulating systems. Raw water by-passes from the exchangers over a specially constructed, spray-type cooling tower having a capacity of 1,000 gpm. The 300-gpm raw-water circulating pumps are the double-suction, ball-bearing type, as are the 150-gpm soft-water pumps.



INDIVIDUAL EXHAUST LINES, TRENCHED FOR IMPROVED STATION APPEARANCE

THE MODERN MUNICIPAL ELECTRIC PLANT IN TIPTON, POWERED WITH THREE 700-HP DIESEL ENGINES

Lubricating System

The lubricating system in each engine is of the force-feed, dry crankcase type, the oil being removed from the engine's crankcase by a pump. The oil is taken through a screen-strainer and forced through a duplex filter of the plate type and then taken over to a 200-gallon tank. The oil is returned from the tank by a second pump integral with the engine, and is forced through a cooler, and through another screen to the bearings of the engine.

The entire capacity of the oil pumps passes through the oil coolers at all times, the surplus oil being by-passed by a spring-loaded valve back to the suction line of the first pump. This particular feature has the effect of balancing the work accomplished by both of the oil pumps and maintains maximum velocity of lubricating oil going through the cooler. Centrifuges are provided to centrifuge the oil either continuously or by batches.

Fuel oil is stored in underground tanks adjacent to the railroad siding, capacity 40,000 gallons. It is unloaded by gravity, and pumped from the tanks to the engine room.

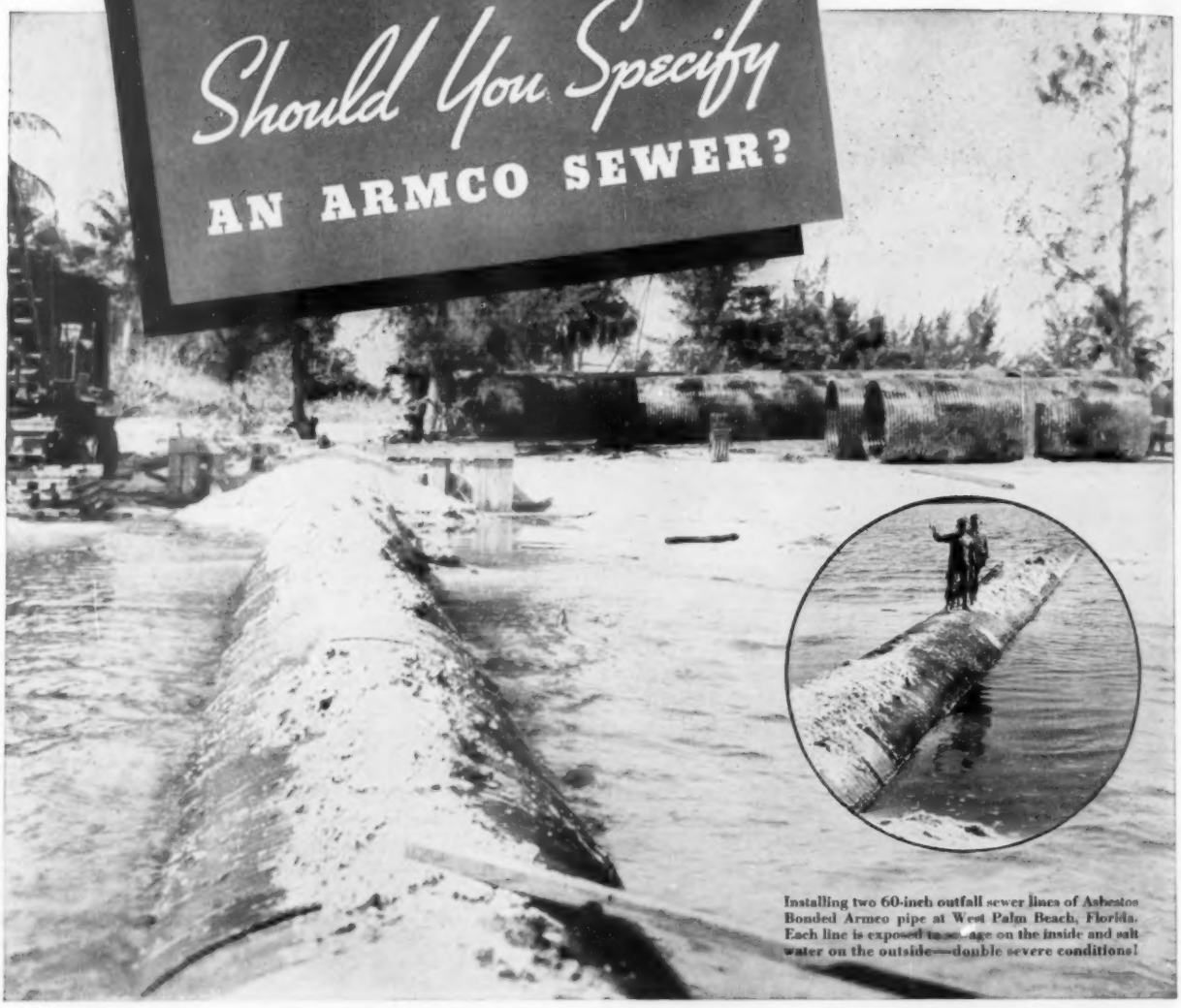
The plant is operated under a normal engine load factor of 57 to 60 per cent and delivers 11.75 kwh per gallon of fuel, and 11.2 kwh after deducting station power requirements. The lubricating consumption amounts to one gallon for 10,000 hp-hours.

The engines are equipped with adjustable hydraulic governors for synchronizing and are electrically-controlled, and keep time within five seconds plus or minus in 24 hours of operation.

The Tipton plant will generate annually more than 1,250,000 kwh. At present two engines carry the day load, with a peak of 900 kw; and one the night load with a peak of 400 kw. One engine is reserved entirely for emergencies.

500 municipally-owned electric utilities, including 310 power plants, present their capacities and earnings in THE MUNICIPAL INDEX 1937. Address 470 Fourth Avenue, New York.

WHY *Should You Specify* AN ARMCO SEWER?



Installing two 60-inch outfall sewer lines of Asbestos Bonded Armco pipe at West Palm Beach, Florida. Each line is exposed to sewage on the inside and salt water on the outside—double severe conditions!

2 Good Reasons

WHEN YOU DESIGN a sewer system of Armco corrugated pipe say good-bye to costly structural failures. Even under the most severe loading and foundation conditions, you can depend on this sturdy, flexible pipe to serve as a line *during its full material life.* This asurance comes from 41 years of successful experience with thousands of installations.

Now to the superior *structural* features of corrugated metal pipe Armco has added a high degree of *material* permanence. Many ARMCO Ingot Iron sewers laid nearly *30 years* ago are sound and strong today. Putting a thick bituminous pavement in the bottom has added at least another *12 years* to the life of Armco pipe. And now . . . with a complete bituminous coating permanently "bonded" to the galvanized metal, your durability problem is solved!

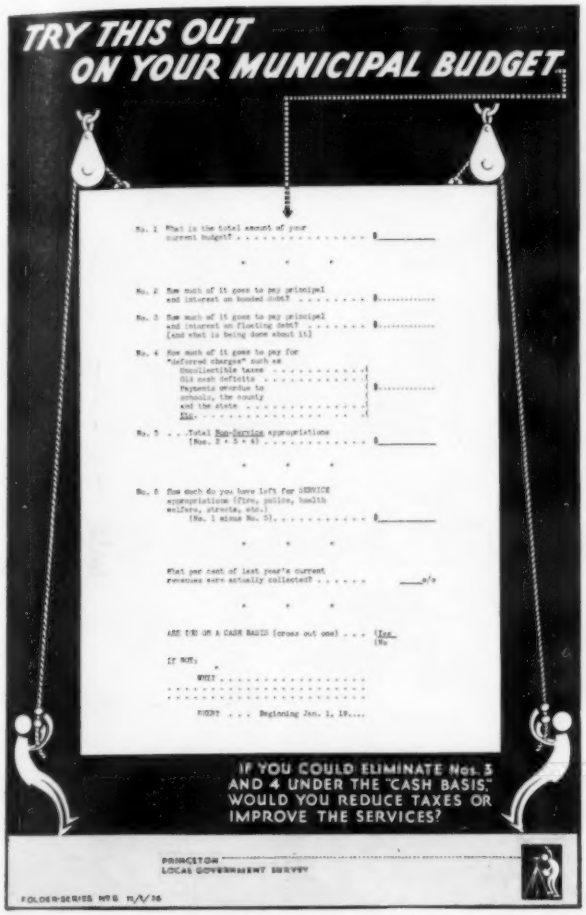
Why not call in an Armco drainage engineer and let him explain the advantages of this improved sewer pipe — in terms of your 1937 requirements? Armco Culvert Mfrs. Association, 703 Curtis Street, Middletown, Ohio.

ARMCO

ASBESTOS BONDED • ARMCO PAVED INVERT PIPE

Do you mention THE AMERICAN CITY? Please do.

A Suggestion from the Princeton Local Government Survey


TRY THIS OUT
ON YOUR MUNICIPAL BUDGET
No. 1 What is the total amount of your current budget? . . . . . $
No. 2 How much of it goes to pay principal and interest on bonded debt? . . . . . $
No. 3 How much of it goes to pay principal and interest on floating debt? . . . . . $
[and what is being done about it]
No. 4 How much of it goes to pay for "deferred charges" such as
Uncollectible taxes . . . . . $
Old cash deficits . . . . . $
Payments overdue to schools, the county and the state . . . . . $
Etc. . . . . $
No. 5 . . . Total Non-Service appropriations [Nos. 2 + 3 + 4] . . . . . $
No. 6 How much do you have left for SERVICE appropriations (fire, police, health welfare, streets, etc.) (No. 1 minus No. 5). . . . . $
What per cent of last year's current revenues were actually collected? . . . . . %
ARE YOU ON A CASH BASIS (cross out one) . . . Yes. No.
IF NOT:
WHY? . . . . . .
RIGHT . . . Beginning Jan. 1, 19....
IF YOU COULD ELIMINATE Nos. 3 AND 4 UNDER THE "CASH BASIS," WOULD YOU REDUCE TAXES OR IMPROVE THE SERVICES?
PRINCETON
LOCAL GOVERNMENT SURVEY
FOLDER-SERIES NO. 6 11/V/36

THE PUBLIC JUDGES THE QUALITY OF LOCAL GOVERNMENT VERY LARGELY ON THE BASIS OF THE EFFICIENCY OF ITEM NO. 6

Planning Boards Increase Rapidly, But Funds Lag

IN a 60-page mimeographed report, dated May 15, 1937, on status of City and County Planning in the United States," the National Resources Committee has tabulated data from 1,716 municipalities having some record of planning or zoning progress. From these places 1,073 town or city planning boards are reported, 933 of which are official and 84 unofficial; for the remaining 56 the status is not given. In addition there are 128 zoning boards, and 515 cities without planning or zoning boards which have adopted some kind of zoning ordinance.

As might be expected, the percentage of the large cities having planning agencies is much higher than that of the smaller cities. For example, in 1934, it was found that each of the five largest cities, and 79 of the 88 cities between 100,000 and 1,000,000 population, had planning agencies. This proportion declines with each group of smaller cities. At the bottom of the list, only 154 of the 14,765 incorporated places of less than 5,000 had such agencies.

In the current 1936 survey, 659 planning or zoning boards did not furnish information as to budgets; 245 cities answered that they had no planning appropriation; 158 cities reported appropriations less than $500; 37 cities reported appropriations from $500 to $1,000; 40 cities reported appropriations from $1,000 to $5,000; 39 cities reported appropriations over $5,000, 9 of which were over $20,000; 4 cities reported that their appropriations were indefinite. Many city planning commissions have technical or clerical employees on the payrolls of other departments and get their materials and supplies through other departments, or occupy office space which is donated.

County and "regional" planning activities have increased so rapidly in recent years as a result of encouragement by state planning boards that a redefinition of the term has gradually developed. Formerly, a planning "region" generally meant a metropolitan area which exceeded municipal boundary lines. Now it is more commonly used to describe large interstate areas, such as the Tennessee Valley, New England, and the Pacific Northwest. In the new report, therefore, "region" is used only for interstate areas, and "district" indicates inter-county areas. At the end of 1936 there were 506 metropolitan and county planning agencies, compared with only 85 in 1933. Of these, there are 316 official, 171 unofficial, 6 whose character was not stated, and 13 whose sole function was zoning.

A new and highly significant group of planning agencies have appeared since the 1934 report of the National Planning Board. Just as the creation of metropolitan planning agencies recognized the unity of urban areas, so in the last few years, district planning boards recognize the common problems of groups of rural counties, such as schools, water and drainage, highway and land use. There are now at least 27 of these district or inter-county planning boards.

In the state planning field there are 39 state planning boards with legislative status, and 7 boards serving by authority and request of the Governors. Appropriations have been provided in 22 states for one or two years beginning July 1, 1937, and prospects for funds by either appropriation or allocation from Governor's contingent funds are favorable in all but a few of the remaining states now having such agencies.

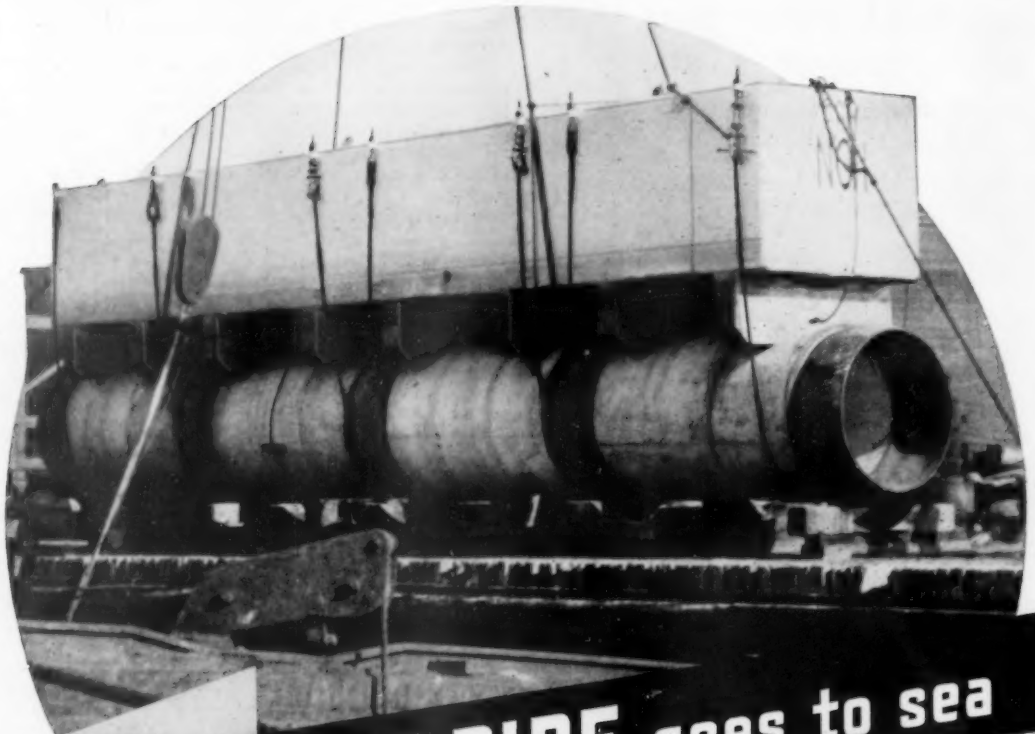
Requests for this document, which has been designated as Circular X, may be addressed to Charles W. Eliot, 2d, Executive Officer, National Resources Committee, Interior Building, Washington, D. C.

Winning Design for Municipal Center and Town Market

THE Perkins and Boring Traveling Fellowship, one of the highest student honors bestowed by the Columbia University School of Architecture, has been awarded for 1937 to Thorne Sherwood of 425 East 86th Street, New York, it is announced by Dean Leopold Arnaud. The subject of the competition was "A Municipal Center and Town Market" and called for a general plan for a civic center for a residential area of about 10,000 people of moderate income within commuting distance of a large city and a development in detail of the town hall.

The Competition winner designed a two-story building in modern style, with official business offices on the first floor, where they would be most easily accessible, and a council room and court room on the second floor. Separate stairways and doorways were provided for city officials, to relieve congestion in the corridors, and the building was so planned that those who wished to go directly to the rooms on the second floor could avoid those transacting their business in first floor offices.

THIS DESIGN FOR A TOWN HALL, BY THORNE SHERWOOD, IS PART OF A GENERAL CIVIC CENTER PLAN THAT HAS WON A TRAVELING FELLOWSHIP OF THE COLUMBIA UNIVERSITY SCHOOL OF ARCHITECTURE



CONCRETE PIPE goes to sea in a half-million dollar sewer project

Four 12-ft. sections of 60-in. reinforced concrete pipe being towed into the Pacific Ocean and lowered into position. The County Sanitation District of Los Angeles County. A. K. Warren, chief engineer, and A. M. Rawn, assistant chief engineer.

THINK of a sewer 60 in. in diameter and 5,000 ft. long that discharges 110 ft. under the surface of the ocean. That summarizes the project now under construction by the Sanitation District of Los Angeles County. It is one of the most difficult pipe line undertakings of record.

For 2000 ft. off shore, the line is built with 18-ft. sections laid in a rock trench with a concrete embedment placed by the tremie method. Throughout this length, except at vertical curves, the joints are caulked from the inside. From the rock trench, the pipe for a distance of 550 ft. emerges onto an ocean bed of sand at 75-ft. depth. In the transition from rock to sand, 12-ft. lengths, equipped with fully flexible ball and socket joints, are employed.

The remaining 2450 ft. consists of 18-ft. sections, inside caulked joints alternating with fully flexible ball-and-socket joints; thus the line is in rigid sections of 36 ft. between fully flexible joints. To provide against leakage in event of movement or settlement due to scour, 80 per cent of the joints are caulked from the inside, access being provided by cast iron manholes at 300-ft. intervals along the line, the covers of which are clamped and wedged in place.

• • •

Where millions are at stake, concrete pipe is the answer to a wide range of problems in sewerage and water supply. It is strong, permanent and moderate in cost—the ideal pipe for every job whether 12 inches or 12 feet in diameter. Send for pipe bulletin "*Subaqueous Concrete Pipe Sewers.*"

PORTLAND CEMENT ASSOCIATION

Dept. 6-4, 33 W. Grand Ave., Chicago, Ill.

The best investment on any sewer project is the services of a competent sanitary engineer for design and construction supervision.

Forward Steps

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

Citizen Support for a Master City Plan

PORTLAND, ORE.—The Chamber of Commerce of this city is not shirking its civic responsibilities. It has shouldered the task of pressing the formulation and vitalization of a comprehensive city plan. Ever since 1919 Portland has had a Planning Commission. This Commission has issued fine reports, it has been effective in approving or disapproving new subdivisions, and has struggled bravely within the meshes of a bad zoning ordinance, but it has failed to establish definite and far-reaching plans for city improvement in spite of its treasure trove of data and expert counsel to this end. No fewer than five planners—Edward H. Bennett, Charles H. Cheney, Day & Zimmerman, Harland Bartholomew and W. W. Amburn—have had some valuable recommendations to make as a result of their studies. The plans by Edward H. Bennett were approved by a decisive vote by the citizens, in spite of which city officials have not seen fit to recognize it as the master plan.

Meanwhile the city is truly suffering from a haphazard development which is wiping out owners' equities and threatening the city budget. A curious occurrence is the growing movement of the major business district eastward, leaving a large section of blight in the western section, particularly along the waterfront, and starting a dangerous rivalry between the east and west sides of the city. It is of prime importance that the transportation system be immediately unified and that the dividing area of blight be rehabilitated in order to restore health to this Pacific coast municipality as a single organism. The Chamber of Commerce has gone into the problem and has taken up the challenge. In its report, "A Master Plan for Portland," the Urban Land Utilization Committee has drawn up a program of action.

Effective publicity and the establishment of cooperative ties between the Chamber, the City Planning Commission, the city officials and the general citizen body appeared of first importance. Four committees have been appointed for this task, the Committee on Cooperation with the City Planning Commission, the Committee on Publicity, the Committee on Public Contacts, and the Committee on Citizens' Forums. To aid the City Planning Commission in the preparation of the Master Plan, a Committee on Master Plan has been appointed. The plan must provide proper standards of land utilization for all city use elements, business, industry, parks and recreation, transportation, housing, civic centers, schools and others. A Committee on Public Works will make a study of the specialized projects. A special Committee on Transportation—Transit—Unification of Terminals seemed necessary owing to the magnitude of these difficulties in Portland. The severe blight in central sections, too, seemed worthy of a separate Committee on Rehabilitation of Blighted Areas. A Committee on Rezoning will look into the existing zoning ordinance, which has proved faulty in many respects, depreciating certain values where they should be stabilized, and will make recommendations for its correction. A Committee on Legislation is intended for the purpose of improving planning efficiency through planning and housing enabling acts and legal sanction of excess condemnation and other devices. Finally, a Committee on Valuations—Trends—Taxes and Speculation has been established to study the all-important problems of revaluating assessed valuation, taxation as a means to curb speculative development (land versus improvement tax), the costs of overdevelopment and blight, and the financing of the city plan.

These Chamber of Commerce Committees intend to produce results. The city of Portland can no longer afford to neglect its potentialities because of improper development. Citizen understanding must be promoted on what city planning can and should do to protect the standards of living of the community and stabilize its property and other values. Only an educational program carried on by such a body as the Chamber of Commerce, utilizing the customary devices for arousing and maintaining interest, will secure the citizen support which is so indispensable to any far-reaching accomplishment.

ELLIS F. LAWRENCE,
Chairman Urban Land Utilization Committee, Chamber of Commerce; Dean, School of Architecture and Allied Arts, University of Oregon.

Traffic-Actuated Signal System Handles a Busy Intersection

DOWNERS GROVE, ILL.—In March, 1936, we installed at the intersection of Ogden Avenue and Main Street, in this village, a Tokheim full-actuated traffic signal system with automatic adjustment. Magnetic detector units were installed by making 4-inch openings under the pavements with a hydraulic pipe pusher and inserting the magnetic detectors directly in the soil below the pavement. Both streets have 40-foot pavements at this intersection, and we use a single 6-foot magnetic detector for covering the right half of each street. We find the effective area to be very efficient and satisfactory.

The detector units on Ogden Avenue, which is the main thoroughfare, are placed 180 feet back from the intersection, and on Main Street, which is considered the cross thoroughfare, they are placed 140 feet back from the intersection. No pavement was cut in making the installation, and there is no visible evidence of the presence of the detectors. We are particularly pleased with these units, as they are in no way affected by weather conditions, including accumulation of ice and snow, and, being entirely under the full thickness of pavement, are

TRAFFIC MOVING EAST ON OGDEN AVENUE, DOWNERS GROVE, ILL., WHILE TRAFFIC ON MAIN STREET HAS REGISTERED A CALL FOR THE SIGNAL AND IS WAITING FOR OGDEN AVENUE TRAFFIC TO CLEAR

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  For brick and granite block streets.
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completely protected from mechanical injury.

We find the controller to be very efficient and reliable in its operation. We have so far not had a single item of maintenance expense. We find the controller also very flexible in its operation, and readily adjustable to meet our traffic needs exactly and to control our traffic with maximum efficiency. The system as used by us requires a call to change the signal. The green periods for the main and cross streets are automatically adjusted by the traffic in accordance with traffic demands. This would continue for a limited number of vehicles or until called by the intersecting street.

We are particularly pleased with the construction of the controller unit—the different functions being provided by five separate units, any one of which is readily removable for inspection and test. This construction in addition permits the controller to be readily converted to meet the great variety of traffic requirements.

G. ORSON DOWNER,
Commissioner Streets and Public Improvements.

City Workers in City Hall Mural

GLOUCESTER, MASS.—The local fireman and police officer wear an expression of their position such as no model could hope to emulate. Consequently, men and women actually employed in the various branches of the city service of Gloucester posed for the new city hall mural depicting city government activities. This mural was done as a Public Works of Art Project under the WPA upon application of this art-conscious city. Its function is to adorn the City Hall corridor and at the same time to arouse interest in civic problems by this pictorial representation.

The central part of the painting is composed of an allegorical group signifying the responsibility of city government. The principal figure, seated on a marble throne, holds the fasces, the ancient symbol of law. Back of the throne are the national and state flags. The genii are the protecting spirits holding the city seal and the lamp of enlightenment. Grouped around this central throne are figures representing the various departments of governmental service—welfare, fire and police protection, schools, auditing, health, and highway construction. The background portrays the present and future of Gloucester.

This realistic mural will soon have a companion piece on the opposite wall representing the City Council in session.

A description of the mural by the artist.

Council-Manager Rejuvenates a Southern City

PENSACOLA, FLA.—For six years, George J. Roark has been demonstrating the advantages of an efficient city manager government to this southern municipality. Today the citizens can look at the budget without shuddering. Bonds that went begging five years ago at $65 to $80 are today finding ready markets at $100 to $110, and bond issues as far advanced as 1941 have been refunded at a decided advantage to the municipality. Pensacola operates on a cash basis for current expenses, and no bank loans have been needed for operating costs since September, 1931.

The various members of the City Council, and the City Manager, have all contributed in a progressively constructive program to effect the greatest economies and at the same time make the city a better one in which to live. Many worthwhile improvements have been made since 1931 at small cost to the taxpayer. The city has cooperated to the greatest possible extent with the Federal program of public works, and the results have been gratifying. Projects include a tuberculosis sanitarium, an airport, a sewage-treatment plant, 27 miles of sanitary sewers, water-works improvement, street widening and street surfacing, and the sprucing-up of all the parks and parkways in cooperation with the garden clubs. Several municipal improvements have been made without Federal relief assistance, notably the acquisition of West End Park, a playground for the northwest section, and a motion-picture machine and equipment for free pictures in the parks. Only $161,000 of new debt has been contracted, to pay off which no ad valorem tax was needed. The Auditor's report has been progressively encouraging. The cash sinking-fund in the bank at the end of succeeding fiscal years was $292,598 in 1933, $342,060 in 1934, $426,799 in 1935, and $486,162 in 1936. Delinquent taxes collected in the past five years amount to $245,509.

HARRY P. FERRISS,
Chairman, The Citizens' Committee.

Lake-Front Improvement in Port Arthur

PORT ARTHUR, TEXAS.—Taking a tip from Chicago and other cities that have profitably reclaimed waste land, Port Arthur is preparing to add to its domain several hundred acres of partly-submerged area along the shore of Lake Sabine, which opens into the Gulf of Mexico in southeast Texas.

Construction of a revetment along the lake front began in March by Jay De Puy, of San Antonio, who was awarded the contract by the Federal Government on his bid of $429,250. The area behind the revetment will be filled in with spoil from dredging operations in the nearby ship canal, another project authorized by the Government. The revetment will consist of 7,500 feet of stepped concrete

MURAL IN CITY HALL, GLOUCESTER, MASS.
Painted by Charles Allan Winter

Barrett

Tarvia

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bulkhead 5 feet above mean low tide, 1,000 feet of wood piling bulkhead at each end of the main unit, and 17,000 feet of earthen levee. The wall will be placed 2,500 feet from shore for a distance of 9,500 feet. The ends will angle in toward the shore and remain a minimum distance of 1,500 feet from the shore line for the remainder of the length. The revetment will be about 5 miles long overall.

Construction of the revetment and the placing of the fill will mark the start of an extensive development program. The city plans to place on the reclaimed area a large airport, a municipal trailer camp, a yacht and small boat basin, an athletic field, a large casino, and an amusement park. The city has established a development board to prosecute these plans.

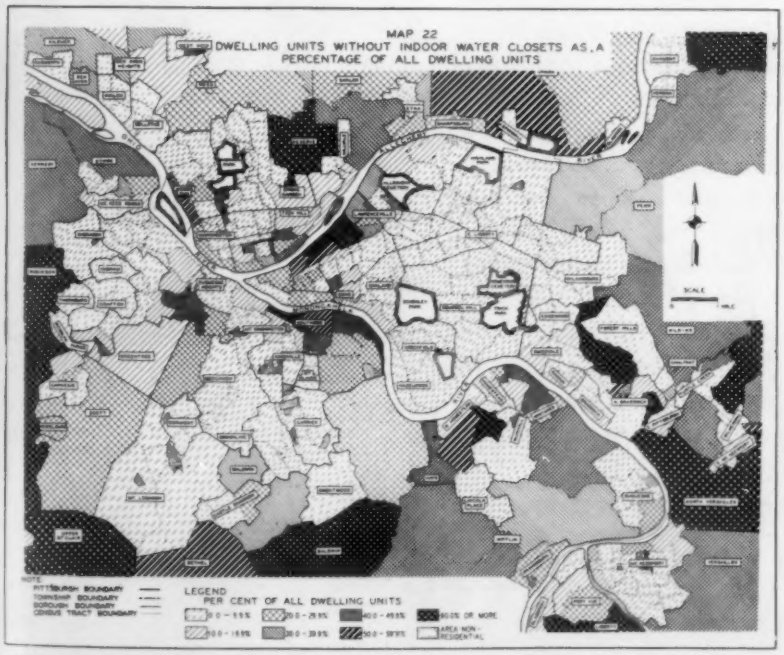
The contractor has 730 calendar days to complete the revetment project. Government expenses on the job have been estimated at $60,000.

J. C. WATKINS.
Port Arthur Chamber of Commerce.

Real Property Inventory of Allegheny County

"OF the 227,932 residential structures in Allegheny County, Pennsylvania, visited by the Real Property Inventory in February, 1934, 6,557, or 2.9 per cent, were listed as unfit for use, i.e., in such a state of physical deterioration that rehabilitation appeared not to be feasible. Moreover, 30,433, or 13.4 per cent, were in need of major structural repairs. Only 96,290, or 42.3 per cent, appeared to be in good condition, needing no repairs."

These figures are taken from the "Real Property Inventory of Allegheny County" a 1937 publication of the Bureau of Business Research, University of Pittsburgh, Pittsburgh, Pa. The report is made up of a large collection of maps and tables which give at a glance the statistics on number, type, age, condition of structures; various kinds of amenities provided; vacancy percentages; transportation available to and from dwelling areas; and many other subjects. Although the figures were collected in 1934, the bulk of them are sufficiently accurate for current use, since there has been relatively little activity in building construction over the past two years. The map reproduced on this page gives a startling impression of the lack of sanitary facilities existing in dwellings in and around Pittsburgh, a condition which is by no means confined to this part of the country.



ONE OF 47 MAPS FROM THE REAL PROPERTY INVENTORY OF ALLEGHENY COUNTY

HOUSING SHORTAGE

The 1937 Yearbook of the National Association of Housing Officials forecasts a nation-wide housing shortage of unprecedented severity and duration. The four main causes are the dearth of new construction, the undoubling of families as times grow better, a rise in the marriage rate, and the increase in the number of family units. Normal needs for the next thirteen years are estimated by one authority at 10,634,000 dwellings—6,389,000 to house new families and 4,245,000 to replace obsolescent houses.

The Municipal Bond Market

Recent sales of new issues from May numbers of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$600,000	Springfield, Mass., Municipal Relief..	1.75	1-10 Ser.	1.71
150,000	Wilmington, Del., Street and Sewer...	2.5	1-10 Ser.	1.84
225,000	Racine Co., Wis., Highway Improvement	2.5	2.16 Avg.	1.95
425,000	Binghamton, N. Y., Relief	2	5.5 Avg.	1.96
100,000	New Canaan, Conn., Town Hall and Fire House	2.5	1-10 Ser.	1.97
110,000	Sands Point, N. Y., Water Works System	3.25	11.85-15.5	2.22
400,000	Ramsey Co., Minn., Public Welfare...	2.5	5.5 Av.	2.36
130,000	Lawrence, Mass., Water Filtration Improvement	2.5	10 Avg.	2.39
140,000	Washington, Pa., Funding and Improvement	2.75	10.16 Avg.	2.59
135,000	Northampton, Pa., Refunding	2.75	9.5 Avg.	2.60
196,000	Dodge Co., Wis., Courthouse	3	1-14 Ser.	2.70
100,000	Manchester, N. H., Municipal Improvement	2	1-20 Ser.	2.74
250,000	Anderson, Ind., Electric Utility Revenue	2.75	6 Avg.	2.74
150,000	Los Angeles Co., Calif., School	3	11 Avg.	2.97
1,000,000	Chicago, Ill., Water System Certificate of Indebtedness	3.5	12-13 Ser.	3.00
100,000	Hamblen Co., Tenn., Refunding	3.25	10.5 Avg.	3.31
1,000,000	Charleston, S. C., Water Works Refunding	3.25	21.33 Avg.	3.48
250,000	Newport, Ky., Funding	4	10.66 Avg.	3.99
135,000	Collingswood, N. J., Sewer Revenue..	4	11.66 Avg.	4.00
150,000	Mississippi State College, Dormitory and Stadium	4.25	11.33 Avg.	4.25

Recent City Manager Appointments

R. L. Billings, former Mayor, has been appointed City Manager of San Leandro, Calif., to succeed Frank R. Chilton.

Katherine Conlin, former City Secretary, has succeeded George Austin as Town Manager of Windsor, Vt.

Ralph D. Klebes, City Chamberlain, and since February 15 Acting City Manager, was appointed City Manager of Elmira, N. Y., on April 19.

W. A. Quinn has been appointed City Manager to succeed F. G. Baker in Oklahoma City. Mr. Baker resumes his duties as City Auditor, the position he held previous to January 1 of this year.

H. M. Kenner, former City Manager of Mangum, Woodward, and Elk City, Okla., has again become City Manager of Elk City. He succeeded W. C. Jones.

R. M. Thomason has been appointed City Manager of Clarksburg, W. Va., to succeed Frank McAndrew.

Houston L. Walsh has been appointed City Manager of Phoenix, Ariz., to succeed Evan S. Stalleup, who is to manage the water works.

L. E. Watkins has succeeded Fred M. Stephenson as City Manager of Edmond, Okla.

E. P. Wilsey, City Manager of San Mateo, Calif., will become City Manager of Hillsborough, Calif., on July 1. He succeeds John C. Nowell.

Edwin A. Ingham, City Manager of Coronado, Calif., will become City Manager of Glendale, Calif., on June 1.

CLARENCE E. RIDLEY,
Executive Director, International City Managers' Association.

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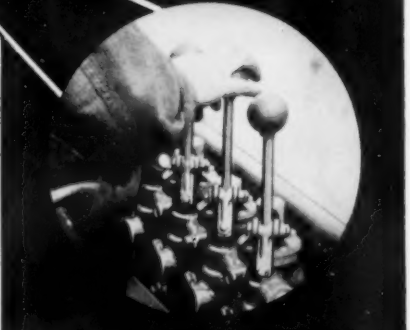

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Traffic Control and Facilitation

Conducted by Publications Committee, Institute of Traffic Engineers, 1 Park Ave., New York
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Clearly-Seen Traffic Signals

What They Are and How to Choose Them

By ROBERT A. MITCHELL
Traffic Engineer, Philadelphia, Pa.

MANY theories have been advanced, and unnumbered panaceas suggested, to help solve the problem of traffic regulation and accident reduction, with the traffic signal probably having more of a corrective effect than any other one thing. But how can traffic signals be made more effective? Where are they warranted? How can they be placed to the best advantage, considering cost?

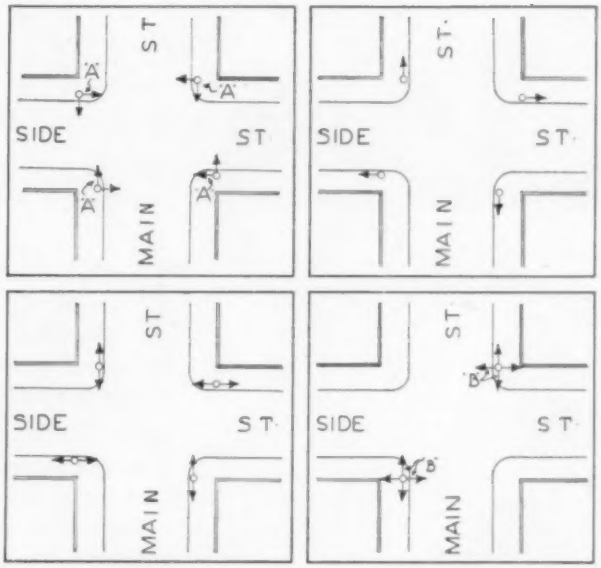
The construction of signals has been more or less standardized by the important manufacturers. Correct timing, or the best type of control to use, is a moot question, and not to be discussed in this article. Best maintenance practices will also be left for another time. The purpose here is to describe advantages and disadvantages of the several types of traffic-signal installations.

The "Manual on Uniform Traffic Control Devices for Streets and Highways" lists a number of the advantages of traffic signals. The value of most of these attributes depends upon and varies proportionately with the ability of motorists and pedestrians to *see* and *understand* the signal indications.

Corner-Post Installation

The several types of corner-post installations (for two-street intersections) depend on the mounting of signal lanterns on posts or bracketing them from utility poles located near the curb on the corners of the intersection. They differ in the number and location of the signals and can be classified by location of posts as follows:

(1) Far-Corner Location
  (a) Two-way, 90-degree signal lanterns mounted on posts or poles located on the far right- and far left-hand corners. (See Fig. 1.)
  (b) One-way signal lanterns mounted in position "A." (See Fig. 1.)
(2) Near-Corner Location
  (a) One-way signal lanterns mounted on posts or poles located on the near right-hand corner. (See Fig. 2.)
(3) Near- and Far-Corner Location
  (a) Two-way 180-degree signal lanterns mounted on posts or poles located on the near right-hand and far left-hand of approaching traffic. (See Fig. 3.)
(4) Opposite-Corner Location
  (a) Four-way signal lanterns mounted on posts located on opposite corners, usually the far right corners of the more important traffic street. (See Fig. 4.)



CORNER-POST SIGNALS, DESCRIBED AT LEFT AND BELOW
Figs. 1 and 2—top, left to right; Figs. 3 and 4—bottom, left to right

  (b) Two-way 90-degree signal lanterns mounted in position "B." (See Fig. 4.)

Corner-post installations have one thing in common: the bottom of the signal lantern is usually mounted approximately 8 feet above the curb or crown of the road, giving several advantages to this type of installation:

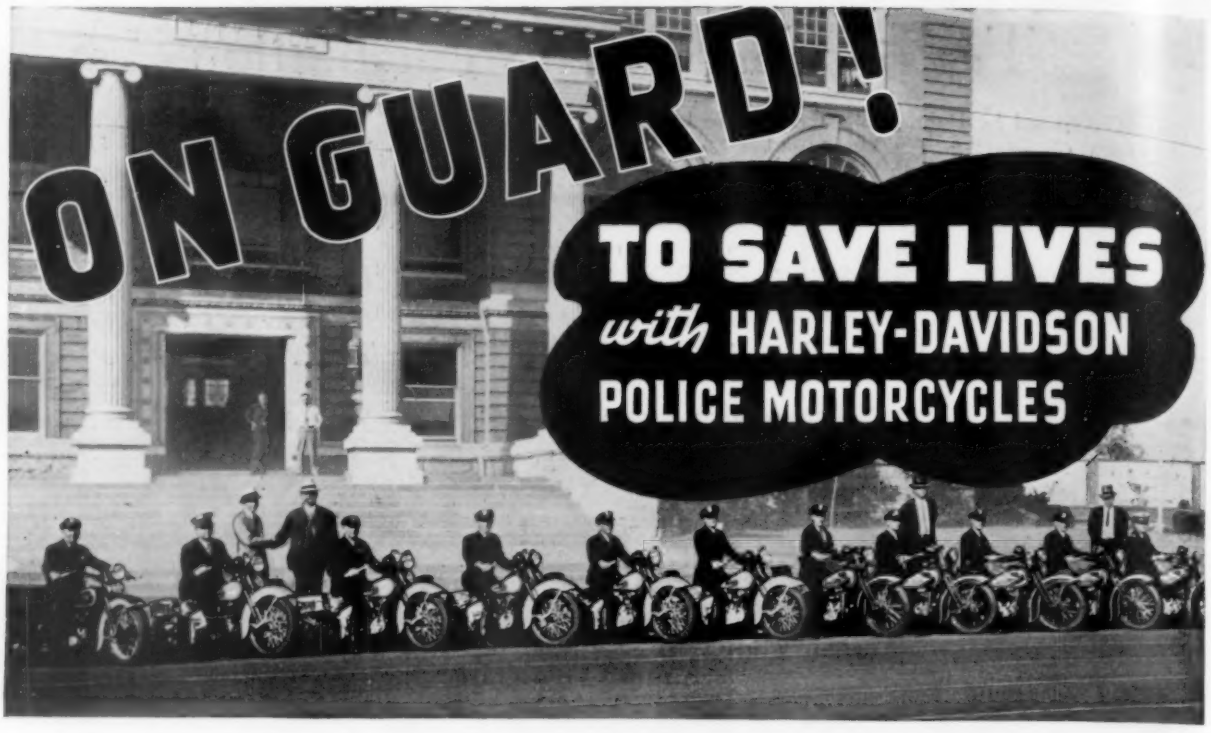
1. Drivers can conveniently see the signal indications without taking their eyes from the road and without assuming an uncomfortable position in the car.
2. The signal indications are low enough to be easily seen by pedestrians.
3. Signal indications are less likely to be obscured by tree branches.
4. Signal lantern will not sway in strong wind.
5. Signal can be seen easier in fog or bad weather.
6. Signal is easier to reach for maintenance.
7. Better angle for light beam, more penetrating.

Make Pedestrians Signal Conscious

Pedestrians, especially those of mature age, must be made traffic conscious. The strict regulation of their movements at signalized intersections would be a most effective way to start them thinking about the traffic problem even though it was along the lines of adverse criticism. Strict regulation might be brought about by legislation, but if proper and convenient signal indications were provided for pedestrians, they might be *encouraged* to abide by the regulations. The far-corner-post installation, as noted under (1a), is the only type that gives proper and convenient signal indications to pedestrians, since it is the only one that gives them a signal directly ahead, no matter which way they are crossing the street.

The installations classified as (3a) and (4a) provide signal indications for every direction, but they are not always directly ahead of the walker, as in installation (1a). Therefore, in urban areas or any other locality where pedestrians are numerous, the corner-post installation type (1a) is the logical one to use for best results.

Numerous accidents occur at signalized intersections because the lamp in a lens was burned out or because a motorist violated a red light, the signal lantern being obscured by another vehicle. The first logical step to take in an attempt to eliminate these types of accidents would be



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Phone your nearby Harley-Davidson Dealer NOW—to bring over a new 1937 model for your inspection. Or write us for literature.

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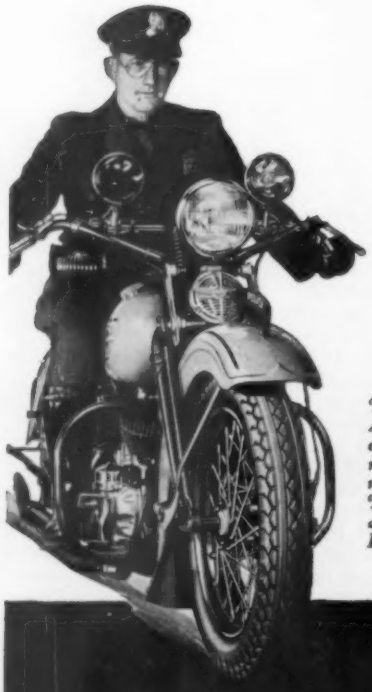

The Little Rock, Arkansas, Chief of Police and his motorcycle-mounted officers. The "mounts" are all Harley-Davidson.

HARLEY-DAVIDSON
The Police Motorcycle

to provide two signal lanterns for each direction of traffic. There are only three corner-post installations (1a, 3a and 4a) that provide this advantage.

The other types have only the advantages listed as common to all corner-post types and are worthless as far as encouraging pedestrians to obey signals or eliminating certain types of vehicular accidents. The only talking-point for the near-corner-post installation (2a) is that intersections are kept more open because motorists must remain back of the near property line to see the signal. By erecting an additional signal lantern at a 180-degree angle on each of the posts in type (2a), we have type (3a). Thus by adding four signal heads we have devised an installation which meets all requirements except adequate indications for pedestrians. If we take type (3a), rearrange the posts and use two-way 90-degree lanterns instead of two-way 180-degree lanterns, we can have, for no appreciable difference in cost, the installation classified under (1a), which, as previously shown, meets all requirements for pedestrians as well as motorists.

There is no standard solution for the installation of signals at multiple intersections, because physical conditions differ at each corner. It is almost impossible to erect signals which will give pedestrians, crossing in every direction, adequate indications without the use of long visors and the installation of a very complicated and expensive timer. The best practice is to provide one near- and one far-side signal for each direction of traffic and require pedestrians to use extreme caution by not giving them definite signal indications.

Pedestal Signal Installation

The pedestal signal, one type of which is shown in Fig. 5, is usually erected near the center of the intersection and requires, to control traffic, the use of only one signal head with as many faces as there are intersecting streets. Sometimes more than one pedestal signal is used at an intersection. Its most obvious applications are at wide intersections where there is not room for islands, and where division of traffic is necessary.

Overhead Signal Installation

The overhead installation is popular because in most cases only one signal unit is needed to regulate traffic. The two main types are:

1. Suspended from cable or guy wires (Fig. 6).
2. Suspended from mast arm (Fig. 7).

With either type the bottom of the signal lanterns must be mounted at least 14½ feet above the roadway. They may be warranted at locations on important rural highways where the terrain is fairly level and visibility is good, but should have no place in the signalization of intersections in urban and most suburban areas where motorists and pedestrians must be adequately taken care of if accidents are to be reduced.

The best that can be said about overhead signals is that they are capable of regulating traffic at minimum expense.

A PEDESTAL SIGNAL AND TWO TYPES OF OVERHEAD SIGNALS (Figs. 5, 6, 7)

Costs

The cost of a signal installation is an important consideration. The value of human life and limb and the cost of replacing damaged property is even more important and must also be considered. Before any plan of signal installation is decided on, one of these factors must be balanced against the other. The result should be the real factor in determining the policy of whether to install quantity or quality; in determining whether we should erect the most efficient type of far-corner-post installations at four intersections or put in mast-arm overheads at seven or eight corners.

In determining cost, the question of timing has to be considered. It is undoubtedly a little cheaper to control a number of signal installations with one timer than to use a timer for each installation. In the estimates to follow, this timer is not included.

The following prices of signal and post not installed (apparatus less the controller) were obtained from a recognized traffic-signal manufacturer. It must be understood that these prices will undoubtedly vary somewhat in different localities and according to the amount of equipment that is purchased. They are, however, probably close enough for the purpose of comparing the costs of each type of signal installation.

Corner-Post Installations

1. Far-Corner-Post Type

(a)

4 4-inch steel posts and bases	$80
4 two-way signal lanterns	320
250 feet 2½-inch conduit	75
300 feet cable	60
Miscellaneous connections	25
Total	$560

(b)

4 4-inch steel posts and bases	$80
4 one-way signal lanterns	140
250 feet 2½-inch conduit	75
300 feet cable	60
Miscellaneous connections	25
Total	$380

2. Near-Corner-Post Type

(a)

Approximately the same as (1b) $380

3. Near- and Far-Corner Location

(a)

Approximately the same as (1a) $560

4. Opposite-Corner-Post Type

(a)

2 4-inch steel posts and bases	$40
2 four-way signal lanterns	230
100 feet 2½-inch conduit	30
150 feet cable	30
Miscellaneous connections	15
Total	$345

(b)

2 4-inch steel posts and bases	$40
2 two-way signal lanterns	160
100 feet 2½-inch conduit	30
150 feet cable	30
Miscellaneous connections	15
Total	$275

NOTE: These costs are based on the use of posts at all corners and enough underground wiring for an average size two-way intersection. The use of existing utility poles and overhead wiring will of course reduce these costs. More ornamental posts cost from $25 to $40 each.

Pedestal Signal Installation

Standard pedestal signals are supplied by all traffic-signal manufacturers for approximately $295. Concrete bases of various types and sizes are usually erected by the municipality, and this will vary the cost.

Overhead Signal Installation

1. Suspended from Cable or Guy Wire

1 four-way signal lantern	$115
100 feet guy wire	3
100 feet cable	15
Total	$133

If new poles are required, the cost will have to be added.

2. Suspended from Mast-Arm

1 four-way signal lantern	$120
1 mast-arm	20
50 feet cable	10
Total	$150

If new poles are required, the cost will have to be added, and if two mast-arm signals are used, the cost is about double.

No attempt has been made to qualify the advantages or disadvantages of the various types of installations by the use of accident records. It is hoped, however, that officials interested in this subject will use the contents of this paper as a start towards analyzing the accident records at their disposal to prove or disapprove the assertions made.

In a midwestern city of 50,000 population, the citizens were demanding that the City Council declare a street located in the residential district a through street, as all fatalities and a third of the injuries and property damage were happening at four intersections along this street. Why the traffic engineer recommended another solution, is told by George W. Barton, Traffic Engineer, Chicago Motor Club, in an exclusive article soon to be published here.

One of St. Paul's Modern Brick Pavements

BRICK COSTS FAR LESS PER YEAR OF SERVICE

• Engineers know much more about pavement construction and paving brick manufacturers are making a vastly superior paving brick than they did 50 years ago.

Yet Virginia Ave., St. Paul, Minnesota, brick paved in 1888 will complete its half century of service in a few more months.

Brick pavements can give such service because they alone are so impervious to weather as well as traffic damage.

As built today, brick pavements are smooth, easy-riding. They are safe. They are the best investment that a dollar's worth of paving funds can buy.

Use brick on new construction. Practically any type of failing pavement may be resurfaced with brick, and give long life with low upkeep costs. For data, write National Paving Brick Association (Affiliated with Structural Clay Products, Inc.) National Press Building, Washington, D.C.

"This Pavement 49 Years Old and Still Serviceable"

—says George M. Shepard, Chief Engineer, Department of Public Works, St. Paul, Minn.

Virginia Avenue, St. Paul, Minn.

BRICK

Public Housing and Taxes

Professor Leland Dissents from Director Gray's Point of View

TO the Editor of THE AMERICAN CITY:

The recent article by the Director of the Housing Division, Public Works Administration ("Public Works and Taxes," in THE AMERICAN CITY for April, 1937, pages 93-97) raises some very interesting issues and is based in part on certain fallacies which merit examination.

The author, Howard A. Gray, appears to assume that the property tax in the United States is primarily based on the ability-to-pay theory. If there is one thing, however, which such an *in rem* levy is *not*, it is a tax based on faculty principles. Nor does the tax in operation attempt to approach such a doctrine. The regression in property assessments does not seem to be known to the author; instead, he bases his argument on such gloss as "so long as the rich live in the best houses and the poor live in the worst, ad valorem taxes bear some rough relationship to ability to pay."

As to the merits of the tax-exemption proposal, there is more to be said than the author has indicated. In the first place, there can be no objection to government entrance into any field of service whereby public welfare is enhanced. If such welfare is not directly increased above the cost, a contemplated service or improvement may still be justified on distributional grounds—one class may provide services for less fortunate classes —but this depends on the relative incidence of *particular* benefits and taxes.

What Form Should Assistance Take?

Is housing a government function, undertaken in the general interest? Or is it a service only to the members of a single class? Or is it a proprietary function, similar to a street railway, light plant or drugstore? Is it such a service that those who use the facilities provided should not bear the entire cost of the service? The tax-exemption proposal should, moreover, be viewed in its true light. It should not be forgotten that any tax exemption granted operates in the nature of a subsidy. Whatever may be said as to the merits of the issue, the cost to the public of tax exemption will appear only if the aid is openly granted by voted subsidies. Exemptions conceal the cost and may distribute it haphazardly or regressively. So much for the form which the "assistance" should take. The real argument begins with a debate as to whether any subsidy at all should be granted to promote housing.

Should the body politic be taxed in order to provide housing facilities for a portion of the population? It is not always the *very poor* for whom they are being provided, as a roster of tenants in existing projects will indicate. The issue is between one part of the population for whom housing facilities are provided and another portion for whom they are not. The answer depends not only on *who gets the service* and their circumstances (as a social welfare proposition) but also on *who is to pay the cost.* If the demand for housing is not sufficient to cause a new supply to be provided, with or without the demolition of old buildings, shall the state vote funds to subsidize such construction? If economic conditions do not provide an effective demand for goods or services desired for ethical, sentimental, or any other reasons except economic ones, shall the government attempt to create or supplement existing demand so as to increase the supply of such services or goods? And what standard, it may be asked, is the government to use in making its decision? Will the same arguments not justify subsidies to provide better clothes, or even better second-hand cars, or anything else which may be desirable but which present economic conditions do not make possible?

Other Obstacles Than Taxes

Before answering these questions it should be noted that one advantage of a capital value tax is that it discourages capital investment in improvements prior to the time when they are economically profitable and similarly adds to the costs of maintaining such property when it becomes unprofitable to retain it in its present use. If taxes were completely remitted, the remaining economic costs would operate with similar tendencies. The effectiveness of their operation increases with their amount, but this affects only the *degree* to which they work and the time lag involved. The effect of tax remission is to lessen economic pressures, not to remove them. Mr. Gray writes as though taxes were the only obstacle to low-cost housing. If this is true, the remedy may be abolition of property taxation, rather than government housing ventures or subsidies for them. A change in taxation, a reduction in building costs, or a shift in interest rates may cause private investments to be made in this field; similarly a reduction in building costs, rates of depreciation or charges for borrowed capital may make unnecessary any change in tax policy.

The arguments for tax-exemption or subsidies apply with equal force to proposals for differential rates for water, light, or other utilities furnished by government enterprises. The cost of these services is an element in determining the profit or loss of housing ventures as well as taxes. It is the impact of total costs on gross revenues which determines the rate of return on private ventures or the rates at which non-profit institutions should sell their services so as to avoid losses. Among the total costs, taxes are no more important than other elements, unless they can be reduced without affecting the services provided by government. Presumably reductions in other costs would curtail services purchased, or the needed supply of goods would not be forthcoming at reduced rates. As between interest and taxes, for example, the interest rate may be a far more effective factor in retarding housing developments than the tax rate. This is true in the case of private reforestation. But because it is a public charge, and because reductions in certain taxes (or exemption from particular taxes) do not appreciably affect the volume of general services offered to individual citizens, campaigns for tax reduction or exemption always hold a certain amount of promise. The governments, too, are often easy to convince by spurious or irrelevant arguments that such preferences should be granted. Yet if tax reductions, service-charge abatements, or subsidies adversely affect the quantity of *necessary* services, housing costs must in any event include them.

Capital Values versus Income Yields

Mr. Gray suggested that all difficulties as to taxation of housing projects could be solved—if such projects are to be taxed—by taxing them not on the basis of capital values but on the basis of income yields. This is no new proposal for property-taxation dilemmas. Those who own non-income-producing property, or property held for speculation, or property which is not devoted to its proper economic use and thus does not earn its full economic rent, are apt to approve this solution. They want it applied to all property. What can be fairer, they ask, than taxation of property according to income? Those who oppose stimulation of speculation via taxation methods prefer capital value taxation. Those who

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CONTROLLED IGNITION OIL TRACTORS

want property brought to its proper use in the shortest space of time place little weight on the sentiment of owners. If owners want to ignore economic trends they should be willing to pay the cost of such folly—others should not subsidize them in so doing. If speculative elements enter into present values, there is no valid argument for not taxing goods at their market value, whatever that is. Goods are bought and sold on that basis. Why a different standard here? And as to the presumed income from non-income-yielding property, how is that to be estimated? If such income is not taxed, a bounty is provided for keeping land out of productive use or for devoting it to uneconomic pursuits. Will the techniques evolved for estimating presumed income from non-income-producing property or from property devoted to uneconomic uses be any better than those employed for guessing at the capital value of property for which there are no comparable sales data? Thus run arguments of the champions on the other side.

It scarcely seems that the issue is one of enlightenment versus ignorance, as Mr. Gray suggests. Nor is the issue one of mere opinion. A few principles of economics would seem to be involved.

How Should Public Housing Costs Be Met?

In order that there may be no confusion as to the meaning of what has been said or implications from the questions asked, a few positive comments should be made. In the first place, proposals for government housing involve two separate questions: (1) Should governments seek to provide low-cost housing facilities, and, (2) if they do, how should their cost be met? This letter has been concerned with the latter and not the former.

As to whether housing should be undertaken, the decision is a matter of policy for legislative determination. So far as principles govern such decisions, the answer should depend on the ability of government to provide facilities at lower net cost than private interests, or to provide them, distributional considerations taken into account, on a more equitable basis. The latter is more a matter of opinion than the former. The one is objective, the other largely subjective. Nevertheless, whatever is in the interest of enhanced general welfare is an appropriate government function. Whether the gain is worth the cost is also a part of the decision. As to housing, the balance in favor of government action seems clear. Here the government has positive advantages over private initiative; among them are lower interest costs, right of eminent domain, construction at cost, economies of large-scale operation, and perhaps others.

As to how the costs should be met, another set of considerations is involved. In the first place, is it appropriate that the services provided should be provided at cost? No valid reason exists for charging more than the cost of these services. If costs are not to be recouped, any subsidies should be outright and open and aboveboard—otherwise the amount of the subsidy will seldom be known, never controlled, and inequitably distributed. If the only cost which housing projects cannot earn is taxes, the subsidy should directly cover them; exemptions should not be granted. If private housing is taxed—or property is taxed at all—there seems to be no reason, from an economic point of view, why government housing projects should not be required to earn similar taxes. If privately supplied housing is needed and must earn taxes, failure to recoup these costs from government tenants will not benefit other tenants and will be a subsidy at the expense of general taxpayers to the tenants in government projects. The distributional advantage here depends on the character of the tax system employed and the relative economic status of the subsidized renters. To avoid carrying the point further, it may be said that the best rule seems to be to require both government and private housing, in the long run, to meet its proper costs, including taxes. Any arguments for not doing so rest on other grounds and need not be considered here.

SIMEON E. LELAND,
Professor of Economics,
University of Chicago.

Local Tax Problems as Viewed by the Twentieth Century Fund Report

THE following paragraphs embody some of the conclusions of the authors of "Facing the Tax Problem: A Survey of Taxation in the United States and a Program for the Future,"* prepared under the auspices of the Committee on Taxation of the Twentieth Century Fund, Inc.:

Tax Limits.—"The recent property tax limits that have been embodied in some state constitutions, especially limits of the overall type, seem to us to be ill-advised, particularly from the point of view of tax justice. They have been set so low and made uniform over so wide an area that they have disrupted long-established fiscal relations between taxpayer and government, and between different units of government. They have given undeserved bonuses to some taxpayers, inflicted heavy burdens on others who have had to supply much of the replacement revenue, and have made some localities largely dependent on the state." (p. 412)

Graded Real-Estate Tax.—"The exemption of improvements might be expected to play an important part in the movement for tax limitations on real estate. If real-estate tax reduction is to serve as a method of social control, it may take the form of a reduction of taxes on improvements in order to encourage construction and widespread ownership of buildings. Distinctions have been made in some cases between urban and rural land, but no tax-limitation law has distinguished between land and improvements; chiefly, perhaps, because such laws have been sponsored largely by farm organizations and by organizations of real-estate dealers and large landowners." (p. 152)

"The chief difficulty with proposals for the single tax and the graded tax, from the point of view of justice, is the damage that would occur to innocently acquired vested interests. One's judgment on the justice or injustice of those proposals will depend chiefly on the importance that one attaches both to these vested interests and to the distinction between destroying them quickly and destroying them over one or more generations." (p. 291)

Homestead Exemptions.—". . . from the point of view of a just distribution of the tax burden we can see no merit in the homestead exemptions recently adopted in Florida and several other states. The most obvious injustice in such exemptions is that they discriminate against the tenant, who must bear in his rent at least part of the real-estate tax burden on his dwelling, and favor the person who happens to be able and willing to own his home." (p. 412)

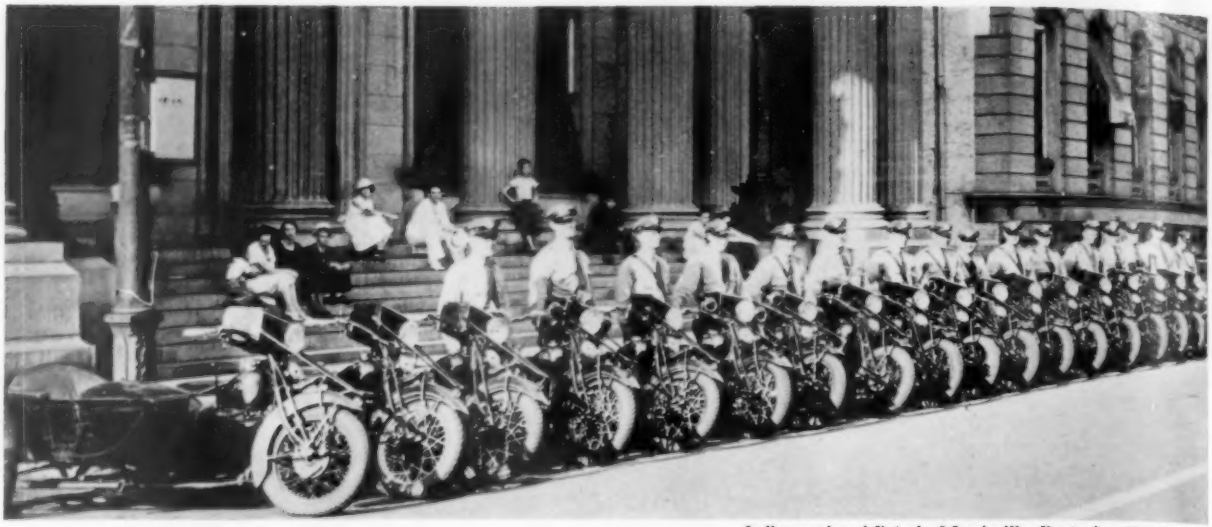
Special Assessments.—"In our opinion, local improvements to real estate present one of the strongest cases for benefit charging. Recently such improvements have been financed, to some extent, in other ways—notably, by grants from the Federal Government as part of an emergency program. We are opposed to a continuation of this policy. We are also disturbed over the relative failure of special-assessment theory and practice to improve in the past decade or two, particularly in some of the large urban centers. We therefore urge that city authorities everywhere, and officials of many classes of rural districts, devote much more thought to this matter than they have done in recent years." (p. 408-9)

Gasoline Tax.—"The motor-vehicle tax and the gasoline tax offer suitable methods of financing most of the cost of highways and part of the cost of city streets. Part of the highway and street costs can be met by special assessments or the real-estate tax because of the benefit to real estate. Another part can be met by general fund revenue because of the general public interest that is involved." (p. 405)

Sales Tax.—"One of our objections to a general sales tax, such as the manufacturers' sales tax recently proposed for the Federal Government or the retail taxes levied by the states, is the repressive effect on sales and the consequent damage to certain producers and distributors. Correspondingly, of course, the net effect on some consumers is to deprive them of certain things that they would otherwise purchase." (p. 404)

Personal Property.—"There are substantial reasons for abolishing the tax on tangible personal property in any state that can possibly raise its revenue in another way. It is difficult to administer. Even if it is perfectly administered, it is a poor means of measuring either the benefit to or the ability of an individual or a business firm. As to the intangibles tax, practically any new revenue source would be an improvement, at least if the intangibles tax is of the orthodox ad valorem full-rate type that is applied to practically all bonds and almost all stock, except sometimes the stock of domestic corporations. It is harder to administer than the tangible personalty tax, and the principle of the tax is even more faulty." (p. 411-2)

* For a brief review of this new book, see THE AMERICAN CITY for May, 1937, page 119.



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Utilities Owned by 935 Municipalities

Data for places of over 10,000 population from the 1937 Municipal Year Book, published by the International City Managers' Association. Of the reporting municipalities, 71 per cent own water works, 28 per cent airports, 14 per cent electric light plants, 12 per cent markets, and 20 per cent no utilities.

Utilities owned and operated are indicated as follows: "E," electric light plant; "Ed," electric distribution system only; "G," gas plant; "Gd," gas distribution system only; "W," water works; "P," port facilities; "M," public market; "S," street railway; "A," airplane landing field; "Ab," abbattoir; dots (.....), no information received.

Alabama

Anniston	AW
Bessemer	None
Birmingham	A
Decatur	A
Dothan	EWA
Fairfield	None
Florence	Ed
Gadsden	W
Huntsville	WAb
Mobile	W
Montgomery	W
Phenix City	None
Selma	WA
Tuscaloosa	WA

Arizona

Phoenix	WSA
Tucson	WA

Arkansas

Blytheville	A
El Dorado	None
Fort Smith	WAb
Hot Springs	None
Jonesboro	EWM
Little Rock	AW
N. Little Rock	E
Pine Bluff	None
Texarkana	None

California

Alameda	E
Alhambra	W
Anaheim	EW
Bakersfield	None
Berkeley	PA
Beverly Hills	W
Brawley	EW
Burbank	EW
Burlingame	W
Compton	None
Eureka	WS
Fresno	WA
Fullerton	W
Glendale	EW
Huntington Pk.	W
Inglewood	W
Long Beach	GWPMA
Los Angeles	EWPA
Modesto	WA
Monrovia	W
Oakland	PA
Ontario	W
Palo Alto	EGWA
Pasadena	EW
Pomona	W
Redlands	W
Richmond	P
Riverside	EW
Sacramento	WPMA
Salinas	None
San Bernardino	W
San Diego	WPA
San Francisco	WASAb
San Jose	None
San Leandro	None
San Mateo	None
Santa Ana	W
Santa Barbara	W
Santa Cruz	W
Santa Monica	WPA
Santa Rosa	W
South Gate	W
South Pasadena	W
Stockton	PA
Vallejo	W
Ventura	W
Whittier	W

Colorado

Boulder	W
Colorado Spgs.	EGWA
Denver	WA
Fort Collins	WSAE
Grand Junction	WA
Greeley	W
Pueblo	WA
Trinidad	W

Connecticut

Ansonia	None
Bridgeport	Ab
Bristol	W
Danbury	W
Derby	None
East Hartford	W
Hartford	WPMA
Meriden	WAAb
Middletown	W
Milford	.....
Naugatuck	None
New Britain	WAb
New Haven	A
New London	W
Norwalk	EW
Shelton	None
Stamford	None
Stratford	None
Torrington	None
Wallingford	EWA
Waterbury	WA
West Hartford	None
West Haven	None
Willimantic	W

Delaware

Wilmington	WP

District of Columbia

Washington	WM

Florida

Daytona Beach	WPA
Gainesville	EWA
Jacksonville	EWPA
Key West	W
Lakeland	EWA
Miami	WPMSA
Orlando	EW
Pensacola	WA
St. Augustine	WPA
St. Petersburg	EdGWPSA
Sanford	WA
Tallahassee	EGWA
Tampa	WPA
W. Palm Beach	M

Georgia

Albany	.....
Athens	WA
Atlanta	WA
Augusta	WPA
Brunswick	None
Columbus	WA
Decatur	W
Griffin	EW
Lagrange	EGWA
Macon	W
Rome	W
Savannah	WPMAAb
Thomasville	EW
Valdosta	W
Waycross	W

Idaho

Boise	A
Pocatello	WA

Illinois

Alton	.....
Aurora	EW
Belleville	None
Berwyn	W
Bloomington	EWA
Blue Island	W
Brookfield	.....
Cairo	None
Calumet City	W
Canton	W
Centralia	EW
Champaign	None
Chicago	WA
Chicago Hts.	W
Cicero	E
Danville	None
Decatur	EW
East Moline	W
East St. Louis	None
Elgin	W
Elmhurst	W
Elmwood Park	None
Evanston	W
Forest Park	W
Freeport	None
Galesburg	WA
Granite City	None
Harrisburg	A
Harvey	W
Highland Park	W
Jacksonville	W
Joliet	WA
Kankakee	None
Kewanee	W
La Grange	None
La Salle	W
Lincoln	None
Mattoon	W
Maywood	W
Melrose Park	W
Moline	W
Mount Vernon	.....
Oak Park	W
Ottawa	W
Park Ridge	W
Pekin	S
Peoria	.....
Quincy	WMA
Rockford	WM
Rock Island	W
Springfield	EW
Sterling	A
Streator	None
Urbana	None
Waukegan	W
West Frankfort	None
Wilmette	W
Winnetka	EW

Indiana

Anderson	EW
Bedford	W
Bloomington	W
Connersville	None
Crawfordsville	E
East Chicago	W
Elkhart	None
Elwood	None
Evansville	WPMAAb
Fort Wayne	EWA
Frankfort	E
Gary	None
Goshen	EWA
Hammond	W
Huntington	EW
Indianapolis	MAG
Jeffersonville	None
Kokomo	.....
Lafayette	W
La Porte	W
Logansport	EW
Marion	W
Michigan City	W
Mishawaka	EdW
Muncie	None
New Albany	MW
New Castle	EW
Peru	EWA
Richmond	EM
Shelbyville	None
South Bend	W
Terre Haute	A
Vincennes	W
Whiting	W

Iowa

Ames	EW
Boone	W
Burlington	PMA
Cedar Rapids	W
Clinton	None
Council Bluffs	WA
Davenport	PA
Des Moines	WMA
Dubuque	WPA
Fort Dodge	WMA
Fort Madison	None
Iowa City	A
Keokuk	None
Marshalltown	W
Mason City	W
Muscatine	EWA
Newton	GW
Oskaloosa	WM
Ottumwa	WA
Sioux City	W
Waterloo	W

Kansas

Arkansas City	W
Atchison	M
Chanute	EGWA
Coffeyville	EWPA
Dodge City	W
El Dorado	EWPMA
Emporia	W
Fort Scott	WA
Hutchinson	P
Independence	W
Kansas City	EW
Lawrence	WA
Leavenworth	W
Manhattan	W
Newton	W
Parsons	WA
Pittsburg	WA
Salina	WA
Topeka	WA
Wichita	AM

Kentucky

Ashland	W
Bowling Green	W
Covington	W
Fort Thomas	None
Frankfort	None
Henderson	EGW
Hopkinsville	EGWAb
Lexington	MA
Louisville	WPA
Middleborough	EA
Newport	W
Owensboro	EWA
Paducah	WMA

Louisiana

Alexandria	EGdWPMA
Baton Rouge	PAb
Bogalusa	WA
Lafayette	EWA
Lake Charles	None
Monroe	EWSA
New Orleans	WMPA
Shreveport	W

Maine

Auburn	WA
Augusta	WA
Bangor	EW
Biddeford	None
Lewiston	EW
Portland	None
South Portland	None
Waterville	None
Westbrook	None

Maryland

Annapolis	WM
Baltimore	AW
Cumberland	W
Frederick	EWMA
Hagerstown	EWMA
Salisbury	W

Massachusetts

Adams	W
Amesbury	W
Arlington	None
Athol	W
Attleboro	W
Belmont	EW
Beverly	WA
Boston	MA
Braintree	EW
Brockton	.....
Brookline	EW
Cambridge	W
Chelsea	W
Chicopee	EW
Clinton	W
Danvers	EW
Dedham	None
Easthampton	W
Everett	.....
Fairhaven	.....
Fall River	W
Fitchburg	W
Framingham	None
Gardner	WA
Gloucester	W
Greenfield	W
Haverhill	W
Holyoke	EGW
Lawrence	WAb
Leominster	W
Lowell	W
Lynn	W
Malden	W
Marlborough	W
Medford	None
Melrose	None
Methuen	W
Milford	None
Milton	None
Natick	.....
Needham	W
New Bedford	W
Newburyport	W
Newton	W
North Adams	W
Northampton	W
N. Attleboro	EW
Norwood	EW
Peabody	EW
Pittsfield	W
Plymouth	.....
Quincy	W
Revere	W
Salem	W
Saugus	.....
Somerville	None
Southbridge	.....
Springfield	W
Stoneham	W
Swampscott	None
Taunton	EW
Wakefield	EGW
Waltham	W
Watertown	W
Webster	W
Wellesley	.....
Westfield	EGW
W. Springfield	W
Weymouth	W
Winchester	W
Winthrop	W
Woburn	W
Worcester	W

Michigan

Adrian	W
Alpena	EW
Ann Arbor	WMA
Battle Creek	.....
Bay City	EdWPMA
Benton Harbor	WAM
Dearborn	W
Detroit	EWMSA
Ecorse	None
Escanaba	EdGWA
Ferndale	WM
Flint	WMA
Grand Rapids	WM
Grosse Pointe Park	None
Hamtramck	None
Highland Park	None
Holland	EW
Iron Mountain	W
Ironwood	GWMA
Jackson	WA
Kalamazoo	EWMA
Lansing	EWM

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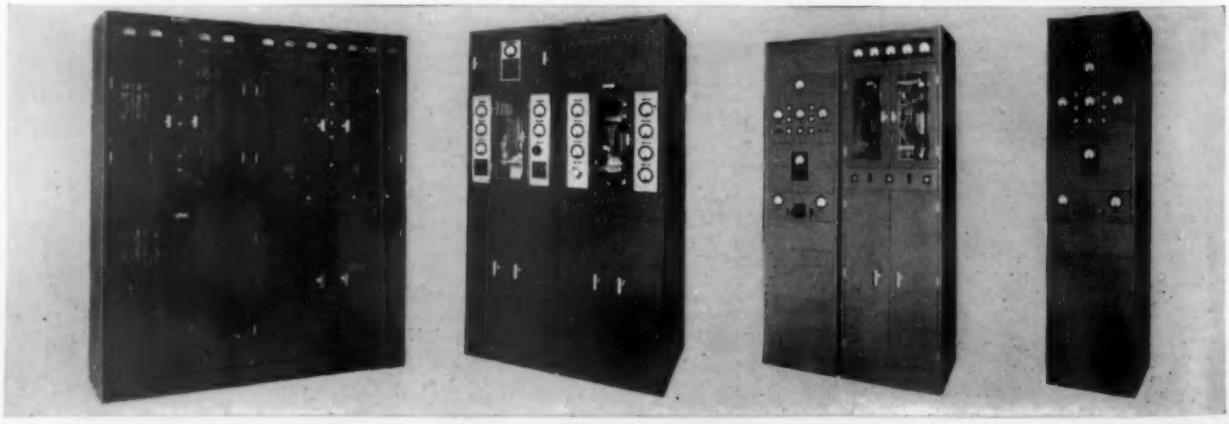

Lincoln Park	None
Marquette	EW
Menominee	W
Monroe	WPA
Mount Clemens	W
Muskegon	M
Muskegon Hts.	W
Niles	EWA
Owosso	W
Pontiac	WMA
Port Huron	W
River Rouge	None
Royal Oak	WM
Saginaw	WA
Sault Ste. Marie	WA
Traverse City	EW
Wyandotte	EW
Ypsilanti	GW

Minnesota

Albert Lee	W
Austin	EWAGd
Brainerd	EWA
Duluth	GWA
Faribault	W
Hibbing	EGWMA
Mankato	W
Minneapolis	WPA
Rochester	EW
St. Cloud	WA
St. Paul	WPMA
South St. Paul	W
Virginia	EWGMA
Winona	W

Mississippi

Biloxi	WA
Clarksdale	EWA
Columbus	WAb
Greenville	WPAAb
Greenwood	EW
Gulfport	WPA
Hattiesburg	WA
Jackson	WA
Laurel	WA
McComb	WAAb
Meridian	W
Natchez	WA
Vicksburg	WA

Missouri

Cape Girardeau	None
Columbia	EWA
Hannibal	EWPMAb
Independence	E
Jefferson City	None
Joplin	M
Kansas City	WMA
Maplewood	None
Moberly	W
St. Charles	W
St. Joseph	MA
St. Louis	WMA
Sedalia	None
Springfield	A
University City	None
Webster Groves	W

Montana

Anaconda	None
Billings	WA
Butte	A
Great Falls	WAM
Helena	WA
Missoula	None

Nebraska

Beatrice	.....
Fremont	EW
Grand Island	EWA
Hastings	EWA
Lincoln	EWA
Norfolk	WA
North Platte	WA
Omaha	GWA

Nevada

Reno	A

New Hampshire

Berlin	W
Claremont	WA
Concord	W
Dover	W
Keene	WA
Laconia	None
Manchester	A
Nashua	A
Portsmouth	WA
Rochester	W

New Jersey

Asbury Park	W
Atlantic City	WMA
Bayonne	None
Belleville	None
Bloomfield	W
Bridgeton	W
Burlington	W
Camden	W
Carteret	None
Cliffside Park	None
Clifton	W
Collingswood	W
Dover	W
East Orange	W
Elizabeth	W
Englewood	None
Garfield	W
Gloucester City	W
Hackensack	None
Harrison	None
Hawthorne	W
Hoboken	None
Irvington	None
Jersey City	W
Kearny	W
Linden	None
Lodi	W
Long Branch	None
Maplewood	None
Millville	W
Montclair	W
Morristown	W
Newark	WA
New Brunswick	WAb
Nutley	None
Orange	W
Passaic	W
Paterson	None
Perth Amboy	EW
Phillipsburg	A
Plainfield	None
Pleasantville	None
Rahway	W
Red Bank	W
Ridgefield Pk.	None
Ridgewood	W
Roselle	None
Rutherford	None
South Orange	W
South River	EW
Summit	None
Trenton	W
Union City	None
Westfield	None
West New York	.....
West Orange	None

New Mexico

Albuquerque	W
Roswell	WA
Santa Fe	None

New York

Albany	WPMA
Amsterdam	W
Auburn	W
Batavia	W
Beacon	W
Binghamton	WA
Buffalo	WPMA
Cohoes	W
Corning	W
Cortland	W
Dunkirk	EW
Elmira	W
Endicott	EA
Floral Park	None
Freeport	EWP
Fulton	WA
Geneva	W
Glen Cove	None
Glens Falls	WA
Gloversville	W
Greenburgh	.....
Hempstead	W
Herkimer	EW
Hornell	WA
Hudson	W
Irondequoit	None
Ithaca	.....
Jamestown	EWM
Johnson City	W
Johnstown	W
Kenmore	None
Kingston	W
Lackawanna	None
Little Falls	W
Lockport	None
Lynbrook	None
Mamaroneck	None
Massena	W
Middletown	W
Mount Vernon	W
Newburgh	W
New Rochelle	None
New York	WPMSA
Niagara Falls	WMA
N. Tonawanda	WM
Ogdensburgh	WMA
Olean	W
Oneida	W
Oneonta	W
Ossining	W
Oswego	WM
Peekskill	W
Plattsburg	WA
Port Chester	P
Port Jervis	W
Poughkeepsie	W
Rensselaer	None
Rochester	WPMA
Rockville Ctr.	EW
Rome	W
Saratoga Spgs.	W
Schenectady	W
Syracuse	WMA
Tonawanda	W
Troy	WMA
Utica	A
Valley Stream	None
Watertown	EWA
Watervliet	W
White Plains	.....
Yonkers	W

North Carolina

Asheville	WM
Charlotte	W
Concord	EW
Durham	WM
Elizabeth City	Ed
Fayetteville	EWAAb
Gastonia	EW
Goldsboro	WA
Greensboro	WAAb
High Point	EdWAb
Kinston	EW
New Bern	EWA
Raleigh	WMAAb
Rocky Mount	EGWA
Salisbury	WAAb
Shelby	EdWAb
Statesville	EWAb
Thomasville	W
Wilmington	WM
Wilson	EGW
Winston-Salem	WM

North Dakota

Bismarck	WA
Fargo	WMA
Grand Forks	WAE
Minot	WA

Ohio

Akron	WA
Alliance	WA
Ashland	WA
Ashtabula	SA
Barberton	W
Bellaire	W
Bucyrus	WA
Cambridge	W
Campbell	W
Canton	W
Chillicothe	None
Cincinnati	WPMSA
Cleveland	EWMA
Cleveland Hts.	None
Columbus	EWMA
Coshocton	W
Cuyahoga Falls	EdW
Dayton	WMA
East Cleveland	W
East Liverpool	W
Elyria	W
Euclid	None
Findlay	WA
Fostoria	W
Fremont	W
Garfield Hts.	None
Hamilton	EGdW
Ironton	W
Lakewood	None
Lancaster	GW
Lima	WA
Lorain	W
Mansfield	WA
Marietta	W
Marion	A
Martins Ferry	EW
Massillon	None
Middletown	W
Newark	W
New Phila.	W
Niles	EdW
Norwood	W
Painesville	EGW
Parma	None
Piqua	EWM
Portsmouth	WA
Salem	W
Sandusky	W
Shaker Heights	None
Springfield	W
Steubenville	WAb
Struthers	None
Tiffin	None
Toledo	WSA
Warren	W
Wooster	W
Xenia	W
Youngstown	WA
Zanesville	WMA

Oklahoma

Ada	W
Ardmore	WA
Bartlesville	None
Chickasha	W
Enid	WA
Lawton	WA
McAlester	WA
Muskogee	WA
Oklahoma City	WA
Okmulgee	WA
Ponca City	EW
Sapulpa	W
Shawnee	WA
Tulsa	WA
Wewoka	WA

Oregon

Astoria	W
Eugene	EWA
Klamath Falls	None
Medford	W
Portland	W
Salem	WA

Pennsylvania

Aliquippa	W
Allentown	W
Altoona	W
Ambridge	W
Arnold	None
Beaver Falls	None
Bellevue	None
Berwick	None
Bethlehem	WM
Braddock	W
Bradford	W
Bristol	.....
Butler	WA
Canonsburg	.....
Carbondale	None
Carlisle	WM
Carnegie	None
Chambersburg	EWM
Charleroi	None
Chester	None
Clairton	None
Coatesville	W
Columbia	None
Connellsville	None
Conshohocken	None
Coraopolis	W
Dickson City	None
Donora	None
Dormont	None
Du Bois	WA
Dunmore	None
Duquesne	W
Easton	W
Elwood City	W
Erie	W
Farrell	None
Franklin	W
Greensburg	None
Hanover	WM
Harrisburg	W
Hazleton	None
Homestead	None
Jeannette	None
Johnstown	.....
Kingston	None
Lancaster	WMA
Latrobe	None
Lebanon	W
Lewistown	None
McKeesport	W
McKees Rocks	None
Mahanoy City	None
Meadville	WM
Monessen	None
Mount Carmel	None
Munhall	None
Nanticoke	None
New Castle	None
New Kensington	None
Norristown	M
North Braddock	Ab
Oil City	WA
Old Forge	None
Olyphant	E
Philadelphia	GWPA
Phoenixville	W
Pittsburgh	WA
Pittston	None
Plymouth	None
Pottstown	None
Pottsville	None
Reading	W
Scranton	None
Shamokin	None
Sharon	None
Shenandoah	W
Steelton	W
Sunbury	None
Swissvale	None
Tamaqua	W
Taylor	None
Turtle Creek	None
Uniontown	None
Vandergrift	None
Warren	None
Washington	.....
Waynesboro	WM
West Chester	W
Wilkes-Barre	A
Wilkinsburg	.....
Williamsport	None
York	None

Rhode Island

Bristol	W
Central Falls	None
Cranston	None
Cumberland	W
E. Providence	W
Lincoln	None
Newport	None
N. Providence	None
Pawtucket	W
Providence	W
Warwick	W
Westerly	W
West Warwick	None
Woonsocket	W

South Carolina

Anderson	AAb
Charleston	WPMAAb
Columbia	None
Florence	WA
Greenville	WA
Greenwood	WE
Rock Hill	EdWA
Spartanburg	WA
Sumter	W

South Dakota

Aberdeen	WA
Huron	W
Mitchell	WA
Rapid City	W
Sioux Falls	EW
Watertown	EWA

Tennessee

Bristol	W
Chattanooga	None
Jackson	EWA
Johnson City	W
Kingsport	W
Knoxville	WMAAb
Memphis	WAPM
Nashville	EWMA

Texas

Abilene	WA
Amarillo	WA
Austin	EMAAbW
Beaumont	WPMAAb
Big Spring	WAbA
Brownsville	EWM

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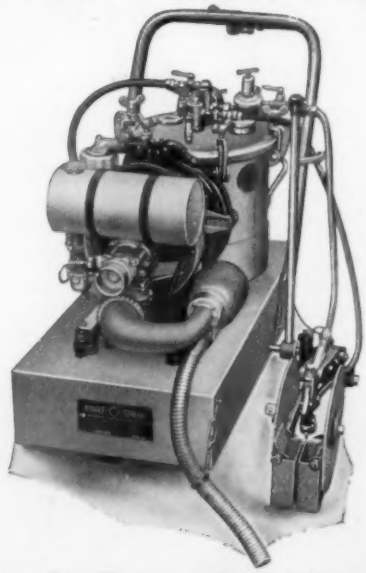

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Brownwood	WAG
Cleburne	W
Corpus Christi	GdWA
Corsicana	W
Dallas	WA
Del Rio	WA
Denison	W
El Paso	WA
Fort Worth	WA
Galveston	WPA
Greenville	EW
Harlingen	None
Houston	GWPM
Laredo	None
Lubbock	EWA
Marshall	WA
Palestine	WA
Pampa	W
Paris	WAAb
Port Arthur	W
San Angelo	Ab
San Antonio	WMA
San Benito	AAb
Sherman	W
Sweetwater	WAAb
Temple	WAb
Texarkana	M
Tyler	WA
Waco	WA
Wichita Falls	W
Utah	
Ogden	WA
Provo	W
Salt Lake City	WPA
Vermont	
Barre	W
Burlington	EWA
Rutland	W
Virginia	
Alexandria	None
Charlottesville	GW
Danville	EWGMA
Hopewell	MA
Lynchburg	WM
Newport News	WP
Norfolk	WPM
Petersburg	WPM
Portsmouth	WM
Richmond	EGWPMA
Roanoke	M
Staunton	EWA
Suffolk	M
Winchester	W
Washington	
Aberdeen	.....
Bellingham	W
Bremerton	WP
Everett	W
Hoquiam	W
Longview	None
Olympia	WMA
Port Angeles	EdW
Seattle	EWPMSA
Spokane	WA
Tacoma	EWPSA
Vancouver	None
Walla Walla	WA
Wenatchee	WA
Yakima	W
West Virginia	
Bluefield	None
Charleston	None
Clarksburg	W
Fairmont	W
Huntington	M
Martinsburg	WMA
Morgantown	None
Moundsville	None
Parkersburg	W
Wheeling	W
Wisconsin	
Appleton	W
Ashland	WPMA
Beloit	None
Cudahy	W
Eau Claire	W
Fond du Lac	W
Green Bay	W
Janesville	W
Kenosha	W
La Crosse	W
Madison	W
Manitowoc	EWA
Marinette	None
Milwaukee	EdWPM
Oshkosh	W
Racine	WM
Sheboygan	WP
Shorewood	None
S. Milwaukee	W
Stevens Point	W
Superior	None
Two Rivers	EdW
Watertown	W
Waukesha	W
Wausau	W
Wauwatosa	W
West Allis	W
Wyoming	
Casper	W
Cheyenne	WA

Improving Municipal Administration

Current Items from the Public Administration Clearing House

Other items from this source will be found on page 5 of this issue

Five New Cities Join Council-Manager List

GREENBELT, MD., first of the Resettlement communities to go under a council-manager charter, leads the growing list of cities adopting this form of government by recent legislative permission or local sanction. The charter of the Maryland settlement, which is near Washington, D. C., has been approved by the State Legislature, bringing the score of new council-manager cities since January 1 to five, reports the International City Managers' Association.

Besides Greenbelt, these are: Middlebury, Vt., population 2,003; Moultrie, Ga., population 6,789; Alameda, Calif., population 35,033; and Orange, Va., population 1,078. Alameda, which adopted the manager plan originally in 1917, seventeen years later placed under separate boards of commissions the control over certain departments previously under the manager, hence lost its council-manager standing. In April, 1937, Alameda returned to the manager plan by adopting a new charter. Orange, Va., adopted the council-manager plan after operating under it by ordinance for the past year and a half. In addition, Maine's Legislature since January 1 enacted council-manager charters for the towns of Bridgton, Dover-Foxcroft, Fort Kent, Milo, Norway, and Old Orchard Beach. If these charters are approved by the annual town meetings, the number of council-manager cities in Maine will be 23.

According to the current issue of *Public Management*, journal of the International City Managers' Association, Thomasville, Ga., is holding a special referendum this month on adoption of the plan, while legislation enabling cities to set up such a charter is under consideration in Florida, Massachusetts, Missouri, and Pennsylvania. Governor George H. Earle of Pennsylvania has appointed a 15-member city charter commission to draft a new charter for Philadelphia, where the manager plan has been sought for some time. Movements for the plan are also under way in Ogden, Utah; Leominster and Springfield, Mass.; Marion, Va.; Ashland and Columbus, Ohio; Rochester, N. H.; Edna, Texas; Clinton and Fort Dodge, Iowa; Columbia, Tenn.; Tulsa, Okla.; Plainfield, N. J.; and Raleigh, N. C. The smallest of these cities is Edna, Texas, population 1,735; the largest, Columbus, Ohio, population 285,000.

Two cities—Binghamton, N. Y., and Cape May, N. J.—recently voted to abandon council-manager government.

At the end of 1936 the council-manager form of government was in effect in 457 cities and 7 counties. All the counties and 438 of the cities are in the United States. At the end of 1920, twelve years after the first such action in 1908, there were 159 council-manager cities in this country; by 1925, 298 cities; and by 1930, 386. The largest number of adoptions was in 1921, when 47 cities voted the plan through charter or ordinance. There are council-manager cities in 36 states. Michigan has 46; Virginia, 42; Texas and Florida, 37 each; California, 35; and Oklahoma, 29 manager cities and counties.

Are Cities Prepared for a Building Boom?

CITIES by and large are being caught short-handed of proper regulations to avoid possible bad effects of the predicted building boom, Walter H. Blucher, Executive Director of the American Society of Planning Officials, said on May 1. He has found that although the legal tools are available in many cases to guard against unwise development of real estate, specific enforcement measures are often either lacking or ineffectually administered.

Mr. Blucher cited a recent study of the New England Regional Planning Commission which reported that only 210 cities in the region have planning boards, and only 60 of these have actually drawn up city plans. Massachusetts and New Hampshire are the only states in the group providing for effective municipal control over subdivisions, and only 60 communities in these states have adequate control, the report showed. Building codes are in force in but 31 towns and cities, and only 168 of the 1,500 communities are zoned.

This situation is repeated in other sections of the country. There are five states still without any kind of city planning enabling laws, and five others require special action of the legislature to give a city the right to draw up a plan. Laws permitting subdivision control exist in virtually all the states with city planning enabling acts; but it is safe to say that very few cities either effectively regulated the real estate subdividing of the last boom period or are taking steps to do so with the recent signs of building.

To be well prepared for materialization of the forecast boom, cities should look to these points, according to Mr. Blucher:

1. *Regulation of subdivided areas, both the old, undeveloped ones of the last boom period and the new crop.*—Lots offered for sale should be of adequate size; the "development" must be supplied with sewers, water mains, pavements and sidewalks free of outstanding special assessments; must have proper transportation facilities to industries and downtown section; must have access to proper school buildings, parks and recreation areas; and must fit in with the general plan of the city, both economically and physically.

2. *Modernized building codes.*—In only a few cities have the building codes that were drawn up many years ago been brought up to date. Availability of new materials is one good reason for changing the old building codes. Guarding against hurried and poor construction that springs up during boom periods is another.

3. *Effective land-use regulation.* — Although 1,200-odd cities in the country have zoning laws to protect against misuse of the land, these laws are frequently not adequately administered, and the regulation consequently is ineffective.

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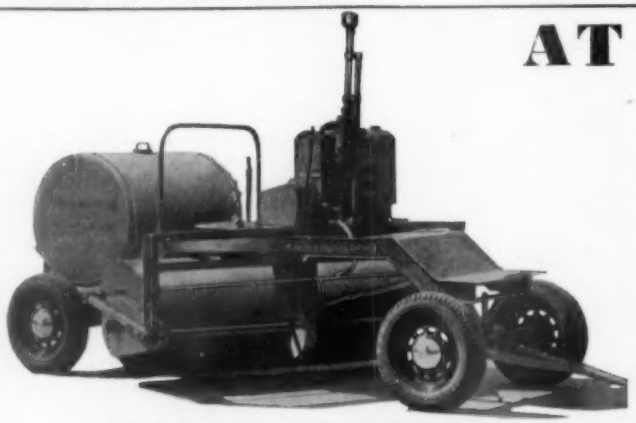

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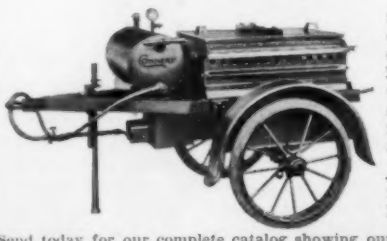

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Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

Zoning and Planning Notes

With the cooperation of
EDWARD M. BASSETT
Author of "Zoning: The Laws, Administration and Court Decisions During the First Twenty Years"

Streets—Parking Meters

ALABAMA.—*Birmingham v. Hood-McPherson Realty Co.*, 172 So. 114 (Supreme Court, January 14, 1937).

FLORIDA.—*State ex rel. Harkow v. McCarthy, Chief of Police, City of Miami*, 171 So. 314 (Supreme Court, December 10, 1936).

MASSACHUSETTS.—*Opinion of Justices*, Supreme Court, April 15, 1937.

OKLAHOMA.—*In re Habeas Corpus of H. E. Duncan*, 65 P 2d, 1015 (Supreme Court, March 9, 1937).

The four authorities, above, deal with various phases of statutes and ordinances providing for the establishment of parking spaces along certain public city streets, the setting-up of permanent meters at the curb, and the collection in this way of a small fee for the use of these spaces, from motorists, for parking a limited period of time.

In the Alabama case the suit was brought by the owner of land abutting upon such a space, for the obstruction of the right of access to his property from the street; and as to the abutter, the ordinance was held to be void.

In the Florida case the user of an automobile claims that the ordinance creates an illegal obstruction in the streets, and the Court overrules his claim.

The Massachusetts authority is an opinion of the Justices of the highest court of Massachusetts with regard to the validity of a proposed statute if enacted into law. Theoretically, such an opinion does not have the weight of an actual case decided by the Court after a contest betwen the parties. The standing of the Massachusetts Court, however, is so high, and the consideration given, on this occasion, seems to be so careful and thorough, that the opinion should be, practically, decisive in Massachusetts, in so far as it purports to go, and of great influence in other states.

The opinion of the Justices of Massachusetts is that, while under a parking-meter statute unconstitutional ordinances might be drawn, such a statute, properly worded, would be valid, and valid ordinances might well be passed under it.

The Oklahoma case also, like the Florida case, involves the claim of the automobilist that parking meters create an illegal obstruction to traffic, and, as in the Florida case, that claim is overruled.

While the parking meter is new, the principles involved in decisions as to the legality of its use are of long standing. The usual city street is devoted to two uses: movement, of people, vehicles, merchandise, water, light and other utilities, etc.; and light, view, and access, of abutting land. Highways may exist, and nowadays are at times created, in which the abutter has no special rights. Such highways are called freeways. The streets we are now considering are of the usual sort, in which the abutter retains his rights.

Many of the purposes of movement require parking, for the loading and unloading of people and goods. Parking, in order that it may not interfere with other rights in the street, must be regulated, and such regulations, if reasonable and proper, are valid under the police power. The sole question we are considering, in its many aspects, is, therefore, whether or not statutes and ordinances providing for parking spaces along city streets, with meters for their use, are reasonable. The answer would seem to be that they are, if properly drawn. The spaces allotted must of course be suited to the streets, the traffic, and the needs of the abutter, and the charge must be no more than sufficient for the purpose of regulation; it cannot be imposed as a source of general city revenue.*

In this connection the following publications of the American Municipal Association (850 East 58th Street, Chicago) on parking meters may be consulted:

(1) Report No. 111, Second Edition, Including Supplement B, December 22, 1936.
(2) *Ibid*, Supplement C, January 25, 1937.
(3) Report No. 111A—Specifications and Conditions for the Installation of Parking Meters in the City of Minneapolis.
(4) News Bulletin, Public Administration Clearing House, Release No. 4, February 4, 1937.
"Parking Meter Ordinance Upheld by Oklahoma Supreme Court" (Duncan case). Apply to Clerk of Supreme Court, Oklahoma City, Okla.
The Massachusetts decision is available in Senate Document 392, Commonwealth of Massachusetts, April 15, 1937.

* Since the foregoing was put in type, our attention has been called to a decision of the Court of Civil Appeals, sitting at Fort Worth, Texas, sustaining the Wichita Falls, Texas, parking meter ordinance. The Court cites with approval the Florida and Oklahoma cases; specifically upholding the validity of the provision for installing the meter, as against the objection of the abutting landowner.

Zoning Ordinance—Procedure

NEW JERSEY.—*Payne v. Borough of Seabright*, 187 Atl. 627 (Supreme Court, September 26, 1936)—Payne began the erection of a restaurant building in a zoned residence district without making an application for a building permit. The work was stopped by the Chief of Police. Payne then "showed the plans" to the Building Inspector and the Mayor and appeared before the board of adjustment who informed him that he must notify all property owners within 500 feet of the proposed building, as required by the zoning ordinance, before he could have a hearing. This Payne failed to do but continued with construction and was arrested and convicted of erecting a business building in a residential zone. He appealed to the Supreme Court of New Jersey for a review of the zoning ordinance and his conviction for its violation.

The Supreme Court decided:

"If that conviction had been under the building code for building without a permit, prosecutor would clearly have been out of court. But . . . it rests on erection of a business building in a residential zone. In such cases the procedure is well settled. The orderly steps are to file the application and plans, meet with a refusal of permit because of the zoning ordinance, appeal to the board of adjustment, and in case of their refusal, to apply for certiorari to review it; after which, in case the finding of the board is set aside, mandamus will lie to compel the issue of a permit. . . . That is the orderly method . . . and was not followed here. Assuming, though not admitting, that, in the absence of any ordinance requiring preliminary application and submission of plans, an owner could take his chances with a zoning ordinance containing no such provisions, and question the reasonableness of the zoning after conviction, no such situation obtains in this case, but, on the contrary, we have an owner plainly in default as to procedure asking in advance of any application under the zoning ordinance or otherwise, for an adjudication that, if he should apply, the zoning provisions would not stand in his way.

"It is suggested that the board of adjustment 'did not fix any date for hearing.' The facts above set forth show that there was nothing legally before the board."

Payne was denied a reviewal of his conviction and the restaurant could not be constructed.

EDITOR'S NOTE.—The comment of the Chicago Regional Planning Association upon this case is: "Violation of zoning ordinance cannot secure reviewal of conviction where orderly procedure outlined in ordinance has not been followed."

—From *Chicago Regional Planning Notes*.

Non-Conforming Use—Extension

NEW JERSEY.—*Anun v. City of Rahway*, 190 Atl. 506 (Supreme Court, March 5, 1937).—One Anun was the owner of a building, in a residential district, erected before the zoning ordinance was passed, and devoted to the (non-conforming) use of an automobile sales-room. He applied to the board of adjustment for permission to construct an adjoining building for the same use, and this permission was refused. The building was isolated from the district zoned for business. The additional land for the new building was purchased after the zoning ordinance went into effect.

And this Court upholds the board in its decision.

A condensed index to legal decisions on zoning and planning presented in The American City during 1936 is given in THE MUNICIPAL INDEX for 1937.

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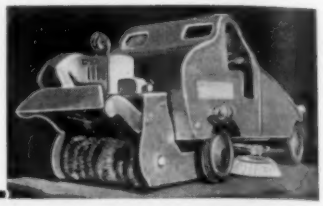

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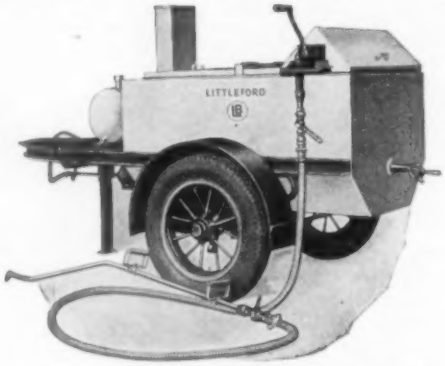

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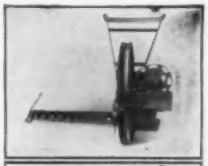

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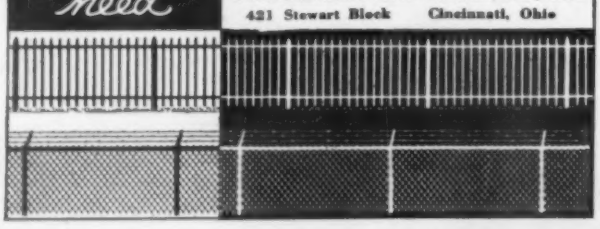

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The City's Legal Rights and Duties

Conducted by A. L. H. STREET, Attorney at Law

Accidents

Under immunity from liability for injuries resulting from exercise of governmental functions, city held not liable for death of prisoner at correction hospital while watching ball game, due to grandstand collapse (New York City, Municipal Court: *Meyer v. City of New York*, 293 N. Y. Supp. 563).

City held not liable for injury to child whose foot slipped between beams while walking on beams lawfully piled in a highway (New York Supreme Court, Appellate Division: *Licata v. City of New York*, 292 N. Y. Supp. 524).

Where roller-skating child fell upon picket fence bordering sidewalk, jury held justified in finding city and abutting property owner liable on theory that fence was nuisance (New York Supreme Court, Appellate Division: *Bland v. Kaufman*, 292 N. Y. Supp. 597).

City held liable for injury to school pupil who fell while walking on a balance beam placed on a slippery schoolroom floor (Connecticut Court of Errors: *Bush v. City of Norwalk*, 189 Atl. 608).

Street worker held entitled to recover under Workmen's Compensation Act for injury to foot frostbitten while he was shoveling snow on bridge (New Hampshire Supreme Court: *Fox v. City of Manchester*, 189 Atl. 868).

Death of fire marshal from heart attack brought on by exertion in fighting fire held accidental and therefore compensable under Compensation Act (Pennsylvania Superior Court: *Foster v. Borough of State College*, 189 Atl. 786).

Annexation Proceedings

Where inclusion of land within city limits had been uncontested since 1914, owner held not entitled to question validity of annexation on the ground of lack of benefits (Florida Supreme Court: *Haines City Heights v. Haines City*, 172 So. 484).

Business Regulations

Ordinance fixing barbers' charges held void (Alabama Court of Appeals: *City of Mobile v. Rouse*, 173 So. 254).

Civil Service

Statutory seniority right to restoration as policeman after being laid off held subject to continued physical ability, so that where a laid-off policeman was not restored and was not entitled to be, he was no longer a member of the force and his surviving dependents were not entitled to recover pay or pension (Ohio Supreme Court: *State v. Turnbull*, 6 N. E. 2d, 971).

Statute bringing fire departments under civil service held not to vacate existing positions (West Virginia Supreme Court of Appeals: *Mathews v. City of Charleston*, 190 S. E. 129).

Condemnation Proceedings

Town held entitled to condemn land for street improvement involved in relocating railroad tracks to eliminate grade crossing (Tennessee Supreme Court: *Town of Cookeville v. Farley*, 102 S. W. 2d, 56).

Contracts

Contract for village well held not invalid because not let to lowest bidder, but vitiated by failure of village to advertise for bids as required by statute (New York Supreme Court, Nassau County: *Maribu v. Nohowec*, 293 N. Y. Supp. 457).

City held empowered to employ financial consultant, in absence of statutory or constitutional prohibition (Ohio Court of Appeals, Summit County: *Arnold v. City of Akron*, 7 N. E. 2d, 660).

Municipality held entitled to employ special counsel to defend officers against suits for acts done on behalf of municipality in good faith (New York Supreme Court, Appellate Division: *Clark v. Smith*, 294 N. Y. Supp. 106).

Council Proceedings

Councilman appointed to fill vacancy held member within requirement that ordinance be passed by a majority of members "elect'" (Kansas Supreme Court: *Tucker v. Raney*, 65 Pac. 2d, 329).

Depositaries

Under statute forbidding banks to pledge assets as security for public deposits, city held bound to return preferential payment received from insolvent depositary bank's receiver (United States District Court, District of Colorado: *Adams v. Cribbs*, 17 Fed. Supp. 723).

City held not entitled to preference against insolvent bank on distribution of bank's assets because of public character of city's deposit (Springfield, Mo., Court of Appeals: *In re Citizens Bank of Senath*, 102 S. W. 2d, 830).

Food Regulations

Municipal requirement that milk sold in city be pasteurized within corporate limits held void as attempt to erect tariff barrier favoring local producers (California Supreme Court: *La Franchi v. City of Santa Rosa*, 65 Pac. 2d, 1301).

Garbage Disposal

Garbage-removal ordinance held constitutionally inapplicable to removal of restaurant by-products prepared there as hog feed hauled through streets in closed containers (Oklahoma Supreme Court: *City of Tulsa v. Bishop's Restaurant No. 4*, 65 Pac. 2d, 436).

Licenses

Sales tax applicable to "corporations" held inapplicable to municipal corporations (Missouri Supreme Court: *City of Webster Groves v. Smith*, 102 S. W. 2d, 618).

Municipal Utilities

Erection of a light plant held not a "local improvement" in such sense as to make taxes therefor "special assessments" leviable only according to benefits to the taxed property (United States District Court, Northern District of California: *Pacific Gas & Electric Co. v. Sacramento Municipal Utility District*, 17 Fed. Supp. 685).

Navigable Waters

City held without right to improve river channel primarily for benefit of private riparian owner (Minnesota Supreme Court: *Behrens v. City of Minneapolis*, 271 N. W. 814).

Riparian owner held not liable to city for rent for use of submerged lands owned by city, in proper exercise of riparian rights (New York Supreme Court, New York County: *City of New York v. Swift & Co.*, 294 N. Y. Supp. 209).

Police Measures

Chief of police held not entitled, in official capacity, to maintain suit to enjoin unlawful Sunday movie (Georgia Supreme Court: *American Legion v. Miller*, 189 S. E. 837).

Ordinance forbidding placing of advertising matter in automobiles, yards, porches and mailboxes upheld (Indiana Supreme Court: *Goldblatt Bros. Corp. v. City of East Chicago*, 6 N. E. 2d, 331).

Ordinance requiring persons composing a crowd on a street or sidewalk, other than a "public meeting," to disperse on police command upheld (California District Court of Appeal: *Ex parte Garrison*, 64 Pac. 2d, 1006).

Poor Relief

Alien held capable of acquiring such statutory residence as would render municipality liable for his support (Vermont Supreme Court: *Town of Barton v. Town of Albany*, 189 Atl. 853).

Prisoners

City held liable for disease contracted by city prisoner through negligently failing to segregate another prisoner known to have a communicable disease (Florida Supreme Court: *Lewis v. City of Miami*, 173 So. 150).

Public Utilities

Factors bearing on reasonableness of natural gas rates determined (United States District Court, Western District of Oklahoma: *Cary v. Corporation Commission of Oklahoma*, 17 Fed. Supp. 772).

Purchases

Where a contract to buy a fire truck was void for failure to provide for a tax levy for interest and principal, seller held entitled to recover truck and, subject to statute of limitations, reasonable pay for its use (United States Circuit Court of Appeals, Fifth Circuit: *City of Floydada v. American-LaFrance & Foamite Industries*, 87 Fed. 2d, 820).

Sewers

Statutory authority to discharge sewage into river held not to authorize discharge in such way as to constitute nuisance to riparian owner (New York Court of Appeals: *Squaw Island Freight Terminal Co. v. City of Buffalo*, 7 N. E. 2d, 10, modifying 284 N. Y. Supp. 598). See, also, *Oklahoma City v. Miller*, 65 Pac. 2d, 990, decided by Oklahoma Supreme Court, and *Parsons v. City of Sioux Falls*, 272 N. W. 288, decided by South Dakota Supreme Court.

City held liable for flooding private basement through neglect to properly seal lateral sewers connected with an abandoned main sewer (California District Court of Appeal: *Durante v. City of Oakland*, 65 Pac. 2d, 1326).

Special Assessments

Statutory exemption to cemetery held to relieve from liability for sewer assessments (Delaware Superior Court, New Castle: *Mayor and Council of Wilmington v. Riverview Cemetery Co.*, 190 Atl. 111).

Streets

Abutters held entitled to enjoin city from constructing overpass in street until payment of damages for interference with light, air and access (North Dakota Supreme Court: *Cummings v. City of Minot*, 271 N. W. 421).

Stucco wall held summarily removable by city so far as encroaching upon street where owner had been warned of encroachment during construction (Texas Supreme Court: *Joseph v. City of Austin*, 101 S. W. 2d, 381).

Taxation

City water engineer's salary held exempt from Federal income tax (United States Supreme Court: *Brush v. Commissioner of Internal Revenue*, 57 Sup. Ct. 495).

Tax levy held not required to itemize amounts levied for fees and salaries of municipal officers and employees (Illinois Supreme Court: *People v. Cleveland, Cincinnati, Chicago & St. Louis Railway Co.*, 6 N. E. 2d, 851).

Taxation of municipal water works so far as used for commercial purposes upheld (Indiana Supreme Court: *De Haven v. Municipal City of South Bend*, 7 N. E. 2d, 184). Municipal utilities held subject to taxation on commercial business done, but gross receipts tax on water, gas and electricity business held void as discriminating in favor of utilities furnishing service to industries (Illinois Supreme Court: *City of Chicago v. Ames*, 7 N. E. 2d, 294).

Traffic Regulations

Ordinance restricting vehicular traffic on beach declared by Legislature to constitute highway upheld (Florida Supreme Court: *Town of Atlantic Beach v. Oosterhoudt*, 172 So. 687).

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Municipal and Civic Publications

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Sanitation

Municipal and Rural Sanitation.—By Victor M. Ehlers, Chief Sanitary Engineer, State Health Department of Texas; and Ernest W. Steel, Professor of Municipal and Sanitary Engineering, Agricultural and Mechanical College of Texas. Second Edition. McGraw-Hill Book Co., Inc., New York. 1937. xiii + 477 pp. $4.00 from THE AMERICAN CITY.

In this well-planned volume, the authors have supplemented the many books on municipal water supply and sewage treatment by presenting a careful study of residential sewage disposal and water supplies and the so-called lesser but still very important sanitary engineering responsibilities of swimming pools, milk and other foods, refuse collection and disposal, the control of mosquitoes, flies and rodents, plumbing inspection and housing. In this second edition, the chapters on ventilation, swimming pools, and excreta disposal have been brought up to date, and important additions have been made to the material on industrial hygiene, milk sanitation, and plumbing. The chapter on mosquito control has been much consolidated, but new material has also been included. This edition also includes a brief discussion of noise abatement, a new field of municipal activity.

The twenty-seven chapters, which are supplemented by four appendices, include discussions of: communicable diseases; excreta disposal, with and without water carriage; the handling of small water supplies; refuse collection and disposal; mosquito, fly and rodent control; milk and food sanitation; plumbing; ventilation; inside lighting; housing; school sanitation; industrial hygiene; tourist camps; swimming pool sanitation; disinfection; vital statistics; and public health organizations. Such diversified topics as a questionnaire to run down the source of a typhoid epidemic, how to make good concrete, a model mosquito control ordinance, and the U. S. Public Health Service standard milk ordinance, make up the four parts of the appendices.

Not only is this an excellent book for health officers, but it should be in the hands of every practicing sanitary engineer, of municipal officials interested in public welfare and sanitation, and students of this broad subject.

The Motor Vehicle

The National Highway Users Conference has consolidated and published some extremely interesting material on the "Economic and Social Value of the Motor Vehicle." Highway transportation has been of untold importance in the development of this country over the past few decades. It provides jobs for over ten per cent of all the gainfully employed, it is one of the greatest consumers of the nation's raw materials and manufactured products, and it has contributed to educational progress, health, relaxation and personal enjoyment. This pamphlet discusses the subject of employment in highway and vehicle construction, the type and volume of materials consumed in these industries, and analyzes those values which are more difficult to measure. The measurable values are strongly established by a large amount of statistical material, which appears in tabular form. 63 pp. (Apply to the National Highway Users Conference, National Press Bldg., Washington, D. C.)

Housing

The Central Housing Committee has compiled a "Comprehensive Housing Legislation Chart" indicating the status of legislation affecting public and private housing as of March 1, 1937. There are seven columns in the chart, giving public housing legislation, special demolition and slum clearance provisions, acts providing for the establishment of limited-dividend housing corporations, planning and zoning enabling acts and ordinances, building codes, laws favorable to expeditious and economical home financing, and laws unfavorable to home financing in each state. (Apply to the National Emergency Council, Washington, D. C.)

Our National Capital

Washington City and Capital—Federal Writers' Project, Works Progress Administration, Washington, D. C., 1937. xxvi + 1141 pp. Maps, plans, illustrations. $3.00.

The Federal Writers' Projects of the Works Progress Administration include an extensive series of American guides. While they describe specific points of interest to the tourist, these guidebooks have extended their function to the presentation of as complete a picture as possible of American communities, their political, economic, industrial, and cultural history and their contemporary scene. This volume on Washington includes detailed accounts of the functional activities of all Government departments and agencies, it describes to considerable extent the L'Enfant basic plan of the city and its development, and it stresses the many architectural achievements of the Capital, both public and private. The completeness of this description of our National Capital is noteworthy and should be greatly appreciated by many interested citizens.

Financial Statistics

The Bureau of the Census, United States Department of Commerce, publishes each year the "Financial Statistics of Cities Having a Population of over 100,000." The summary report of 1935 has just been issued preliminary to the detailed report which will appear later. The statistics are reported in totals, uniformly classified for the purpose of comparing local municipal governments, their receipts and payments. The grand totals of the 1935 statistics have also been published in the Municipal Index and Atlas, 1937. The preliminary report itself is 21 pages in length. 10c. (Apply to Supt. of Documents, Washington, D. C.)

Housing

The Philadelphia Housing Association has undertaken the publication of a *Housing Quarterly*. So many requests have been received for information on local and Federal housing conditions and attempts to correct them that this new publication is in the form of a news bulletin with summaries of significant new developments in the field. Interested persons inside and outside Philadelphia should find it informative. Vol. 1, No. 1, 14 pp. $1.00 per year. (Apply to the Philadelphia Housing Association, 1600 Walnut St., Philadelphia, Pa.)

Sound Driving

Most of us have bad driving habits. Generally the reason is that we did not have the proper education and training at the start. This training does not mean merely memorizing chapters and sections of motor laws, but a thorough and sympathetic knowledge and understanding of sound driving principles and practices which extend beyond state boundaries and differences in traffic laws. Burton W. Marsh, with the assistance of several specialists, has prepared a valuable booklet entitled "Sound Driving Practices," dealing with the basic principles of sound driving and showing how these apply to many of the common situations of driving. 108 pp. (Apply to American Automobile Association, Pennsylvania Ave. at 17th St., Washington, D. C.)

WPA

The Works Progress Administration has published a "Report on Progress of the Works Program" covering activity up to March, 1937. Accounts are given of the actual projects built and operated, the employment provided, and the funds expended. The programs of agencies participating in the WPA are discussed. In the appendix there are detailed statistics supplementing the main body of the report. The information for this study was taken from the periodic reports required by the President. 145 pp. Tables, illustrations. (Apply to the Works Progress Administration, 1734 New York Ave. N. W., Washington, D. C.)

Sewage Treatment

The American Society of Civil Engineers has published a manual on "Filtering Materials for Sewage Treatment Plants." The bases for determining the relative suitability of filter materials are outlined, indicating the points which should be covered by the engineer in setting up specifications. Part I deals with materials for trickling filters, and Part II with fine-grained filter materials. There are several appendices dealing mainly with testing methods, and a bibliography is given. 40 pp. (Apply to the American Society of Civil Engineers, 33 W. 39th St., New York.)

Urban Growth

The habitat of man is constantly changing. Only during the past few generations has city living become the predominant mode, but cities, too, are changing. Communication and transportation inventions have been the largest single factor in the evolution of the city; the railroads first drawing huge agglomerations of population together, and the automobile and increased railroad facilities then tearing them apart, making them more specialized. A pamphlet entitled "Social Characteristics of Cities," by William F. Ogburn, contains a brief scientific analysis of movements in urban growth since the beginning of the twentieth century. Particular problems such as population, family life, specialization and suburban development, government changes, are studied in relation to a considerable body of facts and figures. v + 70 pp. $1.00. (Apply to International City Managers' Assn., 850 E. 58th St., Chicago, Ill.)

Lake Springfield

"Lake Springfield, a Classic Municipal Enterprise" presents the story of the creation of a large artificial lake in Springfield, Ill. Although the primary purpose of this lake was to solve a water-supply problem, it has proved a boon to the city in many other ways. A dam, a power plant and pumping station, and a water purification plant are only part of the program, most of the remaining shore being developed for recreation purposes. This pamphlet is profusely illustrated with maps and photographs of every phase of the project, including the internal equipment of the power plant, pumping station and water purification plant, which is described in some detail. 24 pp. (Apply to Burns and McDonnell Engineering Co., Kansas City, Mo.)

Planning

After twenty-five years of conferences on planning problems, the American Society of Planning Officials felt it high time that some attention be given to the practical administration of a planning office. Consequently, the latest meeting of the Society, on November 19-20, 1936, was devoted to a discussion of local planning problems and the relationship of local planning to county, regional and state planning. Specific subjects covered include personnel of a city planning commission, technical staff and equipment, program of a city planning commission, financing the master plan, and relations with the public, the government and with other planning organs. The Proceedings of the Conference on City Planning Administration are now published in full. 136 pp. $1.50. (Apply to the American Society of Planning Officials, 850 E. 58th St., Chicago, Ill.)

Public Affairs

The Office of Education of the Department of the Interior has organized a list of pamphlet material under the title "Public Affairs Pamphlets." Over 600 inexpensive pamphlets are listed with a few explanatory words about each title. This publication should be useful to social science classes, club study groups, parent and worker education classes, public forums, farm groups, library groups, etc. 85 pp. 10c. (Apply to the Supt. of Documents, Government Printing Office, Washington, D. C.)

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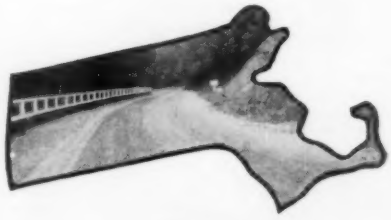

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City and Strike

During the past few years government has become increasingly associated with the labor dispute. Both national and municipal officials are faced with the question of whether we are to have industrial war or peace. Upon local governments in particular rests the responsibility of maintaining the democratic way of doing things by endeavoring to the utmost to promote a better understanding by capital and labor of their mutual problems. "The City's Role in Strikes" is a short collection of articles dealing with the relations of city councils, mayors, city managers, police and labor relations boards to the industrial struggle. The different authors concur in the acceptance of two principles: the need for a much clearer recognition by capital and by labor of their responsibilities in the modern industrial situation; and the need for each side to bare the facts necessary for an intelligent and unemotional settlement. 22 pp. 50c. (Apply to International City Managers' Assn., 850 E. 58th St., Chicago, Ill.)

Social Work

"How to Interpret Social Work," by Helen Cody Baker and Mary Swain Routzahn, is a study course intended for social workers who must answer questions, speak or write about their profession and prepare annual reports. The first ten lessons deal with the three mediums of interpretation, speaking, writing and picturization, describing the different ways of using each for different audiences. The eleventh lesson is designed to show the importance of combining the methods of interpretation in a planned program. The final lesson points out the shared responsibility for interpretation of local, state and national social agencies. A leader capable of stimulating discussion should be selected to conduct this course. 79 pp. $1.00. (Apply to the Russell Sage Foundation, 123 E. 22nd St., New York.)

Kingsport

The Rotary Club of Kingsport, Tenn., has prepared a concise story of the origin, development and present status of this industrial community, for the enjoyment and enlightenment of both residents and visitors. "Kingsport, the City," "Kingsport, the Community" and "The Kingsport Neighborhood" are described in Part I of "Kingsport, Tennessee, City of Industries, Schools, Churches, Homes." The remaining sections deal with "Industrial Kingsport," "Banking, Power, Transportation, Communication, Hotels, Real Estate" and a "Classified Business and Professional Directory." xii + 234 pp. Illustrated. (Apply to the Rotary Club, Kingsport, Tenn.)

Planning

"State and National Planning, An Analysis of the Subject Arranged with Particular Reference to the Classification of Library Material," by Arthur C. Comey and Katherine MacNamara, should be of practical value to the state planning board. It is a classification intended for the filing of all types of material likely to appear in a state planning board library: published literature and graphic material. Gaps appear in the numbering for expansion purposes, and the detail in the treatment of headings, reflect the present importance of any particular topic in the planning field. An alphabetical subject index is included to be used in connection with the scheme. 22 pp. (Apply to the Harvard University Press, Cambridge, Mass.)

Housing

"The Investment Approach to the Housing Problem," by Charles F. Lewis, which appeared in its original form in the *Annals* of March, 1937, has since been printed in a slightly different form in, and reprinted from, the *Real Estate Record* of March 20, 1937. Mr. Lewis believes that if we were to build housing as an investment for rent rather than for speculative gain on quick turnover sales, we might eliminate a good part of our housing troubles of the future. His suggested program of action includes more adequate zoning, slum clearance, FHA research and finance of large-scale operations, and the building of large-scale planned communities on a sound investment basis by private enterprise. Pittsburgh's Chatham Village, of which Mr. Lewis is the Director, is the outstanding illustration of the type of building recommended. 6 pp. (Apply to the Real Estate Record, 119 W. 40th St., New York.)

Mosquito Control

There is no question of the importance of mosquito control to the public welfare. Every public service engineer should be concerned with this problem; yet there are only a few specialists who possess more than superficial knowledge of its principles and practice. The *Engineering News-Record* has recognized the need of a compendium of working information on this increasingly important subject and has reprinted a series of articles by recognized authorities in a single 57-page pamphlet. All phases of the engineering problem of mosquito fighting are touched upon. No community today should be without a definite program for combating this mosquito menace, and any engineers engaged in construction should feel the responsibility of being sufficiently well-informed to guard against the neglectful creation of mosquito breeding-places during their undertakings. $1.00 a copy; 60c each for ten or more. (Apply to the Editorial Department, Engineering News-Record, 330 W. 42nd St., New York.)

Land Use

As a basis for determining the zoning needs of the city and as a first step toward the preparation of a comprehensive city plan, the Sioux City Planning and Zoning Commission, with the aid of the Works Progress Administration, has prepared and published a study entitled "Urban Land Use." The report is composed of sections on population, historical development of the city by subdivisions, general observations on land use, a comprehensive outline of land use in Sioux City, a large collection of special information maps, a concluding presentation of suggestions, and an appendix of tabular data comparing various land uses in Sioux City with similar uses in nine selected cities. 63 pp. (Apply to the Sioux City Zoning and Planning Commission, Sioux City, Iowa.)

Housing and Planning

"Housing and Town and Country Planning" is a publication containing extracts from the Annual Report of the English Ministry of Health for 1935-1936. Four bills concerning housing were passed during the period included, under the comprehensive title *Housing Act*, 1935. This pamphlet covers pretty well the housing situation, the housing policy, and the housing activity of the English Government since the passage of these acts as well as the general house-building situation apart from the government. There is a special section concerning London alone, and there is a section on the financing of housing. The third division of this report is devoted to the recent advances of town and country planning schemes. A number of appendices to the report contain statistics and comprehensive statements relative to housing and planning progress. 69 pp. 1 shilling. (Apply to H. M. Stationery Office, Adastral House, Kingsway, London, W. C. 2.)

Recreation

The Chicago Recreation Commission held its second annual conference in the Stevens Hotel, December 3, 1936. The papers presented have since been published in a 20-page pamphlet entitled "Wider Participation in Planning and Developing Leisure Time Activities." Two of the addresses featured are: "Leisure Time in an Industrial Democracy," by Arthur E. Morgan, Chairman of the Tennessee Valley Authority, and "Recreation as Education," by Miss Agnes Samuelson, Iowa State Superintendent of Schools. Mailing cost, 3 cents in stamps. (Apply to the Municipal Reference Library, 1005 City Hall, Chicago, Ill.)

Housing

The Alley Dwelling Authority for the District of Columbia has printed a report covering the first two years of its work. The ten-year task of clearing 200 inhabited alleys has begun bravely with acquisition of ten squares, redevelopment of six squares, redevelopment started in one square, sale of two squares, redevelopment planned in one square, acquisition begun in three squares, and activity in nine other squares. The "Report of the Alley Dwelling Authority, 1936" covers the story of the purpose, the organization and the accomplishments of the Authority, 25 pp. (Apply to the Supt. of Documents, Government Printing Office, Washington, D. C.)

The Torrens Law

"The Torrens Law—An Argument for It" has been recently prepared by Wendell P. Barker, Chairman of the Mortgage Commission of the State of New York. The purpose of the pamphlet is to point out the principles of an ideal system of title conveyance and to bring about greater familiarity with the system of land-title registration as compared with the recording system, by explaining the superior advantages of the former method and its machinery in conforming to the best principles. Mr. Barker shows that the Torrens system of registration reacts positively to all the tests of security, simplicity, accuracy, cheapness, expedition and suitability to circumstances. 16 pp. (Apply to the Mortgage Commission of the State of New York, 346 Broadway, New York.)

Annual Report

The citizens of Topeka, Kans., received the 1935 Annual Report with such good grace that the same style has been carried over to 1936. Prior to 1935 a strictly financial document was customary, but since that date the report has been brightened up considerably by narratives of the departments and data of historical value for future reference. Tables and graphs are used liberally for illustration. At the close of each narrative is shown the "per capita cost," "cost to the average property," "per annum" and "per month." 91 pp. (Apply to Dept. of Finance and Revenue, Topeka, Kans.)

Urban Land Use

The Iowa State Planning Board has completed four out of eleven contemplated Urban Land Use reports. Those finished are for Webster City, Muscatine, Sioux City and Burlington. Each contains a series of maps indicating the distribution of various use elements in the city and an explanatory paragraph. Finally, a number of concluding pages present recommendations of planning procedure for the area in question. Reports for Burlington and Muscatine are still available at 50c each. (Apply to Iowa State Planning Board, Oransky Bldg., Des Moines, Iowa.)

Planning Agencies and Laws

The Division of State Planning, State of New York, has published a 1937 "Directory of Regional, County and Municipal Planning Organizations." All planning boards on record in the state of New York were requested to provide the latest information relative to their organization, location, activities and accomplishments, which is briefly presented in each case. In addition, this publication contains a descriptive index of laws of New York State pertaining to planning, zoning, subdivided lands and municipal housing. 58 pp. (Apply to the Division of State Planning, Albany, N. Y.)

Training for Public Service

"Training for Public Service in Virginia," by Egger, Baumes and Uhl, takes stock of the present standards and working conditions of Virginia's public servants and points out a few methods by which present waste can be eliminated to some extent. The possibilities of governmental service as a career are discussed, and the importance of the existing opportunities for training are cited. 88 pp. (Apply to the Bureau of Public Administration, University, Virginia.)

Other Reports Received

CHICAGO, ILL.—"Leisure Time Directory," Chicago Recreation Commission, 1937.

LYNCHBURG, VA.—Annual Report, 1936. 44 pp.

MCPHERSON, KANS.—Annual Report, 1936. 36 pp.

MINNEAPOLIS, MINN.—"Budget Facts and Financial Statistics for 1937." 40 pp.

MONTREAL, QUE.—Report of the Director of Finance, fiscal period May 1, 1935, to April 30, 1936. 60 pp.

MOOSE JAW, SASK.—Financial Statement, 1936. 54 pp.

MOOSE JAW, SASK.—Proceedings 32nd Annual Convention, Saskatchewan Association of Rural Municipalities, February 9, 10, 11, 12, 1937. 71 pp.

SPOKANE, WASH.—Annual Report, City Auditor, 1936. 111 pp.

WASHINGTON, D. C.—"Trends in Different Types of Public and Private Relief in Urban Areas, 1929-35," by United States Department of Labor. 143 pp.

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Conventions -- When and Where

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

JUNE 7-11.—BUFFALO, N. Y.
American Water Works Association. Annual convention. (Statler Hotel.) Secretary, Harry E. Jordan, 29 West 39th Street, New York.

JUNE 10-12.—SWARTHMORE, PA.
Joint meeting. Pennsylvania Parks Association. Secretary, Herman Cope, 35 North 6th Street, Philadelphia, Pa. *National Conference on State Parks.* Executive Secretary, Miss Harlean James, 901 Union Trust Building, Washington, D. C.

JUNE 14-15.—ABERDEEN, S. DAK. (200)
League of South Dakota Municipalities. Annual convention. (Ward Hotel.) Secretary, Dr. G. R. Breckenridge, University of South Dakota, Vermillion, S. Dak.

JUNE 16-17.—WAUKEGAN, ILL. (150)
Illinois Association of Sanitary Districts. Annual convention. (Karcher Hotel.) Secretary-Treasurer, G. H. Radebaugh, Urbana, Ill.

JUNE 16-18.—FARIBAULT, MINN. (300)
League of Minnesota Municipalities. Annual convention. Executive Secretary, C. C. Ludwig, University of Minnesota, Minneapolis, Minn.

JUNE 17-19.—OTTAWA, ONT. (300)
Canadian Public Health Association. Annual meeting. (Chateau Laurier.) General Secretary, Dr. J. T. Phair, Spadina House, Toronto, Ont.

JUNE 18.—COLLINGSWOOD, N. J.
South Jersey Association of Water Superintendents. Meeting. Secretary, Walter Spencer, 2707 Bethel Avenue, Merchantsville, N. J.

JUNE 21-23.—STATE COLLEGE, PA. (150)
Pennsylvania Sewage Works Association. Annual conference. (Home Economics Building of the College Hotel—Nittany Lion.) Secretary, L. D. Matter, Kirby Health Center, Wilkes-Barre, Pa.

JUNE 22-24.—DIXVILLE NOTCH, N. H. (800)
New England Association of Fire Chiefs. Annual convention. (Balsams Hotel.) Secretary-Treasurer, John W. O'Hearn, 99 Main Street, Watertown, Mass.

JUNE 23-25.—STATE COLLEGE, PA. (300)
Pennsylvania Water Works Operators' Association. Annual convention. (Pennsylvania State College.) Secretary-Treasurer, I. M. Glace, 22 South 22d Street, Harrisburg, Pa.

JUNE 24-25.—EDMONTON, ALTA.
Union of Alberta Municipalities. Annual convention. (MacDonald Hotel.) Secretary-Treasurer. J. E. Fraser, Wetaskiwin, Alta.

JUNE 27-JULY 1.—DETROIT, MICH.
National Education Association of the United States. Annual meeting. Secretary, Willard E. Givens, 1201 16th Street, N. W., Washington, D. C.

JUNE 28-30.—ELIZABETH, N. J.
Associated Municipal Signal Services. Annual convention. (Elizabeth Carteret Hotel.) Acting Secretary, William F. Franklin, 420 Lexington Avenue, New York.

JUNE 28-30.—SARATOGA SPRINGS, N. Y. (600)
Conference of Mayors and Other Municipal Officials of the State of New York. Annual convention. Secretary, William P. Capes, City Hall, Albany, N. Y.

JULY 5-11.—PARIS, FRANCE.
International Union of Local Authorities. Conference. Address: Clifford W. Ham, American Municipal Association, 850 East 58th Street, Chicago, Ill.

JULY 5-13.—PARIS, FRANCE.
Housing and Town Planning Congress. International Federation of Housing and Town Planning. General Secretary, Donald C. L. Murray, 25 Bedford Row, London, W. C. 1, England. *International Housing Association.* General Secretary, Prof. Franz Schuster, Hansa-Allee 27, Frankfort a/M, Germany.

JULY 21-23.—ERIE, PA. (300)
Pennsylvania Chiefs of Police Association. Annual convention. (Hotel Lawrence.) Secretary, F. B. Titus, Lansdowne, Pa.

JULY 27-29.—NEW YORK.
New York State Association of Chiefs of Police. Annual convention. (Astor Hotel.) Secretary-Treasurer, James L. Hyatt, 503 Western Avenue, Albany, New York.

AUGUST 15-21.—EVANSTON, ILL. (300)
National Institute for Commercial and Trade Organization Executives. Annual meeting. (Northwestern University.) Secretary, C. R. Miles, 836 First National Bank Bldg., Chicago, Ill.

AUGUST 16-19.—DES MOINES, IOWA. (500)
League of Iowa Municipalities. Annual convention. (Savery Hotel.) Secretary-Treasurer, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 17-19.—SYDNEY, N. S.
Union of Nova Scotia Municipalities. Annual convention. Secretary, Arthur Roberts, Bridgewater, N. S.

AUGUST 18-20.—DEARBORN, MICH.
American Water Works Association—Central States Section. Annual meeting. (Dearborn Inn.) Secretary, H. L. Nelson, 2122 Koppers Building, Pittsburgh, Pa.

AUGUST 26-28.—WILMINGTON, N. C.
American Water Works Association—North Carolina Section. Annual convention. (Cape Fear Hotel.) Acting Secretary, A. R. Hollett, University of North Carolina, Box 281, Chapel Hill, N. C.

AUGUST 30-SEPTEMBER 2.—CLEVELAND, OHIO.
National Municipal Signal Association. Annual convention. (Hotel Statler.) Secretary, Irvin Shulsinger, 7 East 42d Street, New York.

SEPTEMBER 1-3.—BALTIMORE, MD.
National Shade Tree Conference. Annual conference. (Lord Baltimore Hotel.) Secretary-Treasurer, Dr. R. P. White, New Jersey Agricultural Experiment Station, New Brunswick, N. J.

SEPTEMBER 13-16.—BOSTON, MASS. (200)
Municipal Finance Officers' Association of the United States and Canada. Annual convention. Executive Director, Carl H. Chatters, 850 East 58th Street, Chicago, Ill.

SEPTEMBER 13-14.—WINSTON-SALEM, N. C.
North Carolina League of Municipalities. Annual convention. (Hotel Robert E. Lee.) Secretary, Patrick Healy, Jr., Capital Club Building, Raleigh, N. C.

SEPTEMBER 15-17.—AURORA, ILL. (350)
Illinois Municipal League. Annual convention. Secretary, A. D. McLarty, 500 East Capitol Avenue, Springfield, Ill.

SEPTEMBER 16-17.—FOND DU LAC, WIS. (700)
League of Wisconsin Municipalities. Annual convention. (Hotel Retlaw.) Secretary, Frederick MacMillin, 114 North Carroll Street, Madison, Wis.

SEPTEMBER 19-23.—WHITE SULPHUR SPRINGS, W. VA.
American Transit Association and Affiliated Associations. Annual convention. (Greenbrier Hotel.) General Secretary, Guy C. Hecker, 292 Madison Avenue, New York.

SEPTEMBER 20-22.—SANTA FE, N. MEX.
American Water Works Association—Rocky Mountain Section. Annual meeting. (LaFonda Hotel.) Secretary-Treasurer, B. V. Howe, 437 State Office Building, Denver, Colo.

SEPTEMBER 20-21.—VIRGINIA BEACH, VA. (500)
League of Virginia Municipalities. Annual convention. (Cavalier Hotel.) Executive Secretary, Morton L. Wallerstein, 902 Travelers Building, Richmond, Va.

SEPTEMBER 21-24.—POLAND SPRING, MAINE (600)
New England Water Works Association. Convention. (Poland Spring House.) Secretary, Frank J. Gifford, 613 Statler Building, Boston, Mass.

SEPTEMBER 22-23.—RICHMOND, KY.
The Kentucky Municipal League. Annual meeting. Executive Secretary, Carl B. Wachs, Municipal Building, Lexington, Ky.

SEPTEMBER 27-30.—FORT WORTH, TEXAS.
American Institute of Park Executives and the American Park Society. Annual convention. Executive Secretary, Will O. Doolittle, Box 422, Tulsa, Okla.

SEPTEMBER 27, WEEK OF.—WHITE SULPHUR SPRINGS, W. VA.
Illuminating Engineering Society. Annual convention. (Hotel Greenbrier.) General Secretary, A. D. Cameron, 51 Madison Avenue, New York.

OCTOBER 2.—CONCORD, MASS.
Massachusetts Federation of Planning Boards. Planning conference. (Concord Inn.) Secretary, Gilbert Robinson, 38 Garfield Avenue, Medford, Mass.

OCTOBER 4-6.—ATLANTA, GA.
American Public Works Association. Congress. (Atlanta Biltmore Hotel.) Executive Director, Frank W. Herring, 850 East 58th Street, Chicago, Ill.

OCTOBER 4-7.—BALTIMORE, MD. (1,000)
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Wilmington, Del.

OCTOBER 5-8.—NEW YORK.
American Public Health Association. Annual meeting. Executive Secretary, Dr. Reginald M. Atwater, 50 West 50th Street, New York.

OCTOBER 5-7.—OMAHA, NEBR.
League of Nebraska Municipalities. Annual convention. (Hotel Fontenelle.) Secretary-Treasurer, S. E. Beals, 204 Brownell Building, Lincoln, Nebr.

OCTOBER 10-12.—KANSAS CITY, MO. (100)
Institute of Traffic Engineers. Annual meeting. (Hotel President.) Secretary-Treasurer, Harold F. Hammond, 1 Park Avenue, New York.

OCTOBER 10-15.—PHILADELPHIA, PA.
American Prison Association. Annual congress. (Hotel Bellevue-Stratford.) General Secretary, E. R. Cass, 135 East 15th Street, New York.

OCTOBER 11-14.—AUSTIN, TEXAS.
American Water Works Association—Southwest Section. Annual meeting. Secretary-Treasurer, Lewis A. Quigley, 3320 West Berry Street, Fort Worth, Texas.

OCTOBER 11-15.—KANSAS CITY, MO.
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 13-15.—ATLANTIC CITY, N. J. (200)
Pennsylvania Water Works Association. Annual meeting and convention. (Haddon Hall.) Secretary, Dr. F. Herbert Snow, 327 Telegraph Building, Harrisburg, Pa.

OCTOBER 18-21.—NEW ORLEANS, LA.
International City Managers' Association. Annual convention. Executive Director, Clarence E. Ridley, 850 East 58th Street, Chicago, Ill.

OCTOBER 19-22.—OKLAHOMA CITY, OKLA.
International Association of Fire Chiefs. Annual conference. (New Municipal Auditorium.) Secretary, James J. Mulcahey, 16 Franklin Avenue, Yonkers, N. Y.

OCTOBER 19-20.—CINCINNATI, OHIO.
Ohio Conference on Sewage Treatment. Annual convention. (Netherland Plaza Hotel.) Secretary, B. M. McDill, Department of Health, Columbus, Ohio.

OCTOBER 20-23.—SACRAMENTO, CALIF.
American Water Works Association—California Section. Annual meeting. (Senator Hotel.) Secretary-Treasurer, Carl M. Hoskinson, Chief Engineer, Division of Water, Sacramento, Calif.

OCTOBER 20-23.—NEW YORK.
National Association of Assessing Officers. Annual convention. Executive Director, Carl H. Chatters, 850 East 50th Street, Chicago, Ill.

OCTOBER 25-27.—DODGE CITY, KANS.
League of Kansas Municipalities. Annual convention. (Lora Lock Hotel.) Executive Secretary, John G. Stutz, Lawrence, Kans.

OCTOBER 25-28.—BALTIMORE, MD. (200)
National Tax Association. Annual conference. (Lord Baltimore Hotel.) Secretary, W. G. Query, South Carolina Tax Commission, Columbia, S. C.

OCTOBER 28-30.—ST. PAUL, MINN.
American Water Works Association—Minnesota Section. Annual meeting. Secretary-Treasurer, Ronald M. Finch, 414 Flour Exchange, Minneapolis, Minn.

DECEMBER 6, WEEK OF.—MEMPHIS, TENN.
The Asphalt Institute. Conference. Managing Director, J. E. Pennybacker, 801 Second Avenue, New York.

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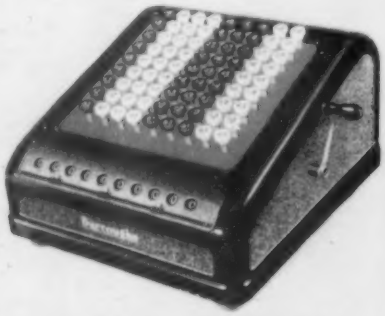

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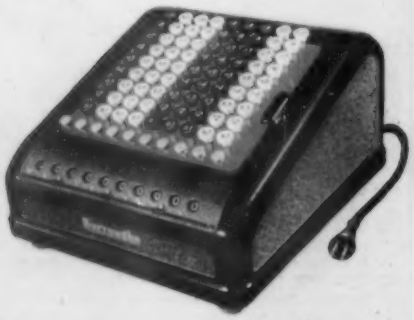

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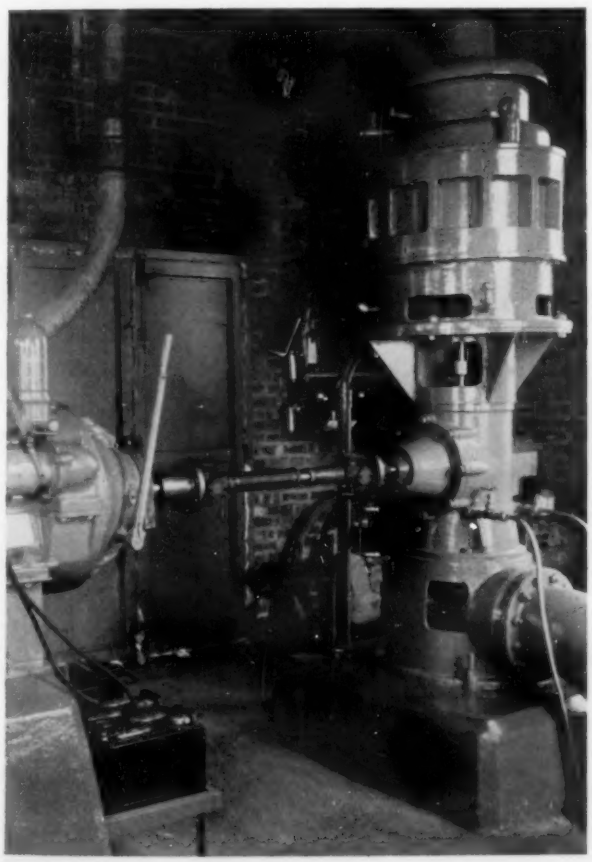
News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Flexible Shafts Drive Deep-Well Turbines

The application of Watson-Spicer needle-bearing flexible shafts to municipal pump operation is increasing steadily, according to the H. S. Watson Co., 1145 Harrison Street, San Francisco, Calif. This new drive offers an unusual degree of alignment flexibility for driving deep-well turbine pumps from engines and for electric-driven vertical sewage pumps. Its construction is entirely of metal, making use of four sets of needle bearings to avoid friction losses and prevent whining at higher speeds. On new installations, it is reported that costly lining-up of pumps and motors becomes unnecessary, as do heavy sub-bases usually employed to maintain alignments. The flexibility of the shafts will permit a turbine pump to settle 5 inches and tilt 1 inch before resetting becomes necessary.

Several Watson shafts are coupled together for driving vertical sewage or pit pumps, furnishing a simple solution for an otherwise complicated and costly alignment of bearings, and yet these shafts are reported to operate entirely free of vibration.



WATSON-SPICER FLEXIBLE SHAFT, DRIVING A DEEP-WELL TURBINE PUMP

Purity for Water in Swimming Pools

The popularity and consequent demand for public swimming pools has advanced amazingly in recent years. Realizing that pure, clear water is a vital requisite for safe, popular and profitable swimming pools, The Permutit Co., 330 West 42nd Street, New York, has issued a copyrighted booklet of 40 pages on automatic equipment for maintaining the purity of swimming-pool water. This booklet, which is free to readers of THE AMERICAN CITY on request, describes the expense and unsanitary characteristics of the old fill and draw system, and then the value and protection of the recirculation system now used most commonly. Other vital parts of properly operated swimming pools, including the recirculation pump, alum and alkali feeds for the pressure filters, and hair catchers, are described.

Filtration plants for summer pools can be made entirely automatic in operation, requiring no attention by an operator. Plants of this type are illustrated and described in considerable detail, accompanied with well-prepared drawings which are useful to park and recreation officials whose duty it is to see that pools are properly operated.

The various methods of sterilizing water for swimming pools is discussed in some detail and the various types of sterilizing equipment are described and illustrated. Other auxiliary equipment which is mentioned includes a suction cleaner for the bottom of the pool and pool walls, an exchange heater for warming the pool water, chemical test kits, inlet and main drain fittings, and scum gutters.

Westinghouse Appoints Mahan General Advertising Manager

S. D. Mahan has been appointed General Advertising Manager of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. Formerly Manager of Merchandising Advertising, Mr. Mahan in his new position will have general supervision over all advertising and sales promotion work of Westinghouse and its subsidiary companies. His headquarters will be in Mansfield, Ohio, where the merchandising division of the company is located.

Sales Engineer for Toncan

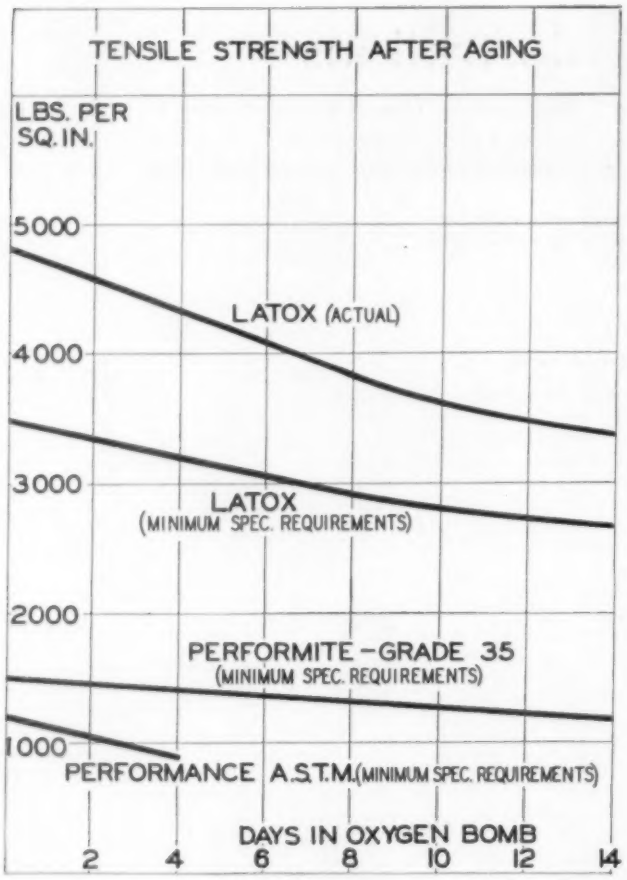
H. P. Pickering, formerly in the engineering department of the Santa Fe Railroad, and since connected with the U. S. Bureau of Public Roads, has joined the Toncan Culvert Manufacturers' Association, Republic Building, Cleveland, Ohio, as sales engineer for the Association.

Hydro-Tite Booklet with Reference Tables

A 48-page flexible-bound booklet on Hydro-Tite, a self-calking material for cast iron pipe joints, containing many useful water-works tables compiled from handbooks and furnished by leading authorities, has been issued by the Hydraulic Development Corporation, 50 Church Street, New York. This booklet not only contains a large amount of useful information, but is well indexed to make it readily available to water-works engineers, superintendents and foremen as well as municipal officials who wish to be up to date in water-works information.

The information on Hydro-Tite is complete, and is accompanied by diagrams and illustrations showing how this self-calking jointing material makes "bottle-tight" joints. The supplementary useful information includes tables of pit cast and centrifugal cast iron pipe, chemical dose conversion factors, copper sulphate treatment for reservoirs, a cost-of-pumping chart, a diagram for the Williams and Hazen formula, a weir discharge table, suggestions for the disinfection of water mains, fire-flow tests, fire-stream tables, a page of most useful general information including conversion tables, and a reproduction of part of a circular showing what leaks cost householders.

The Hydraulic Development Corp. will be pleased to send copies of this catalog without cost to readers of THE AMERICAN CITY who write to the company stating their water-works connection and mentioning this magazine.



LOST!

Only one third in twenty-five years!

The aging properties of any insulation are very important points to consider when you are buying cables. The chart serves to illustrate that Simplex-LATOX resists to a surprising degree the deteriorating effects of time. The fourteen days in the oxygen bomb represent approximately twenty-five years of natural aging. In this acknowledged equivalent of twenty-five years Simplex-LATOX has lost less than one third of its original strength.

The chart also shows that the rate of loss of tensile strength is even less at the end of twenty-five years than during the first few years. This indicates a deterioration of Latox of less than two thirds its original effectiveness over a period of fifty years. This also indicates a tensile strength of more than 3200 lbs. at the end of fifty years, approximately two and one half times as great as for the best 30% compounds when new.

The electrical properties of LATOX are the best of any known rubber insulating compound. LATOX possesses high dielectric strength, high insulation resistance, low dielectric constant, (specific inductive capacity) and low power factor.

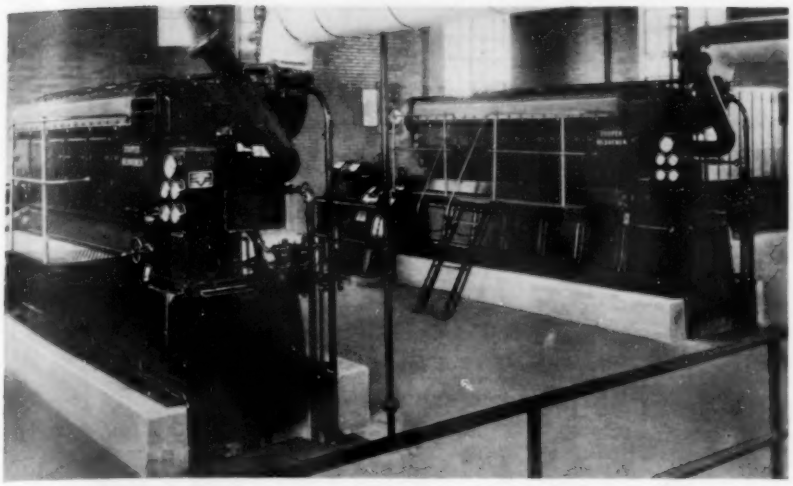
Simplex-LATOX is a high grade, rubber insulation for wires and cables and is made directly from liquid latex. It is vulcanized in liquid form and applied to conductors by a "dip" process. Simplex-LATOX is the result of years of research on the development of a rubber insulation having long life, high electrical quality and stability, and capable of application to conductors in relatively thin walls which maintain the factor of safety of present day heavy walls of insulation.

A revised and very interesting paper "Simplex-LATOX — A New Cable Insulation" is just off the press. Do you want a copy? We would be pleased to send one.

Simplex Wire & Cable Co., Sidney St., Cambridge A, Boston, Mass.

Simplex – LATOX

Thin wall insulation made directly from rubber latex



TWO COOPER-BESSEMER DIESEL ENGINES DRIVING WESTINGHOUSE 250-KW GENERATORS IN THE CITY WATER WORKS, CONNERSVILLE, IND.

More Water at Less Cost

The city of Connersville, Ind., with about 12,000 population, is reported to be saving $31.80 a day by use of two new diesel-electric sets at the municipal water works. A reduction in fire-insurance rates for all property owners is anticipated because of the better fire protection furnished. Three pumps have been installed, but only one is being used; this one is delivering more water than was ever possible under the former set up.

The daily coal cost for steam power pumping was $46. The total daily fuel cost of operating the new municipal water works is $14.20 a day. The water service provided is reported to have been definitely improved throughout. The two diesel engines, built by The Cooper-Bessemer Corp., Mt. Vernon, Ohio, are rated at 363 hp each at 400 rpm and are direct-connected to two 250-kw generators.

Since the recent State Legislature empowered the city to light the streets with surplus current, this is now being considered, according to William F. Dentlinger, Mayor.

Mack Announces Its Lightest Truck

Rated at 16,000 pounds gross, the new Model EJ, just announced by Mack Trucks, Inc., Long Island City, N. Y., is the lightest truck yet built in the regular Mack line. It is available in four wheelbases ranging from 146 to 194 inches. Three tractor wheelbases are available ranging from 139 to 158 inches. The largest tire size used is 8.25x20.

A six-cylinder engine with 3½ x 5-inch bore and stroke powers this model. The engine has a piston displacement of 288 cubic inches and develops 84 hp at the governed speed of 2,800 rpm. Drive is from a dry single plate clutch through a five-speed unit-with-engine transmission with direct drive in fifth as standard, an over-geared fifth being available at slight extra cost. The final drive on this model is of the single-reduction spiral bevel type with three available ratios—4.86, 5.83, and 6.80.

The four-wheel footbrakes of this model are hydraulic and vacuum booster actuated with a braking area of 370 square inches. The chassis frame is pressed carbon steel 8 inches deep, ¼-inch wide, and with a 3¼-inch flange.

Chapman Installing 24-Inch Cone Valve in Buffalo, N. Y.

At the same time that the city of Buffalo, N. Y., is entertaining the American Water Works Association Convention, during the first week of June, the Division of Water will be completing the installation of a 24-inch altitude cone valve made by the Chapman Valve Mfg. Co., Indian Orchard, Mass. This cone valve is to be manually operated in one of the 36-inch lines. The Division of Water will leave this pit open during the Convention so that the valve may be inspected. The installation is on 7th Street, about 100 feet south of George Street in Buffalo.

Steel Pipe for Toledo

The city of Toledo, Ohio, has placed an order for 17,000 feet of 48-inch steel pipe with the Bethlehem Steel Co. This pipe is to be lined with cement under a separate contract with T. A. Gillespie Co., of New York. Cement will be applied by the centrifugal process developed by the Gillespie organization.

American Pipe Manual

Attractively bound in semi-flexible leather covers, the Tenth Edition of the American Pipe Manual is now ready for distribution by The American Cast Iron Pipe Co., Birmingham, Ala.

The Manual contains 205 pages, held together by a new plastic binding which permits the pages to lie flat when the book is opened. This latest edition covers several products now listed for the first time, including 2-inch cast iron pipe in the regular bell-and-spigot, prepared joint, and mechanical joint types, 2-inch cast iron fittings, Mono-Cast Doublex Simplex pipe, Doublex Simplex split sleeves, and split bell sleeves, the Doublex Simplex river crossing joint, the Molox Doublex Simplex joint, Molox ball-joint pipe, cement-lined pipe and fittings with extensive data and specifications, Mono-Cast well tubing and casing, and Monoloy threaded cast iron pipe.

The Tenth Edition of the Manual is profusely illustrated with installation photographs and step-by-step action photographs showing the assembly of mechanical joints. For many years a favorite source of technical information for users of cast iron pipe, copies of this new edition may be obtained free by any readers of THE AMERICAN CITY.

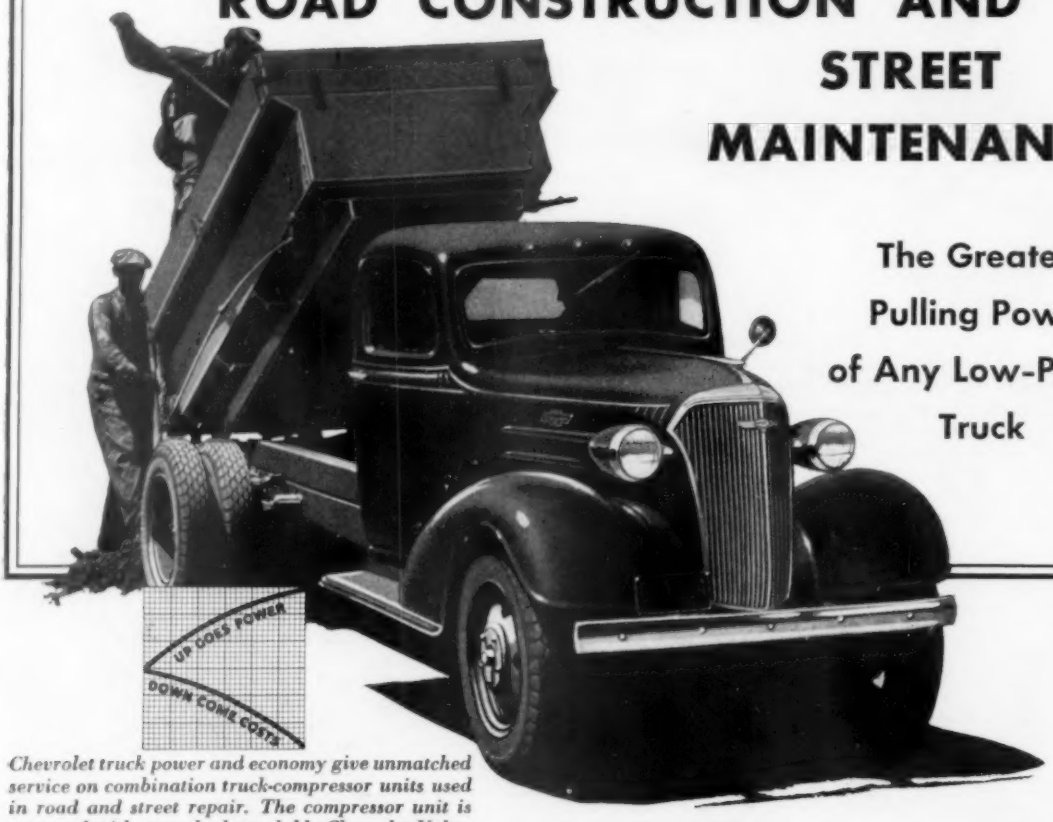
NOT FROM THE WHITE HOUSE, BUT FROM SOUTH BEND

This photograph, suggestive of the more harmonious relationships we are hoping to develop between government and capital and labor, was taken not in Washington, but in an Indiana manufacturing plant. The workman, William C. Troy, has been for many years in the employ of the M. B. Skinner Co., of South Bend

CHEVROLET

MOTOR UNITS FOR MUNICIPAL REQUIREMENTS

ROAD CONSTRUCTION AND STREET MAINTENANCE



The Greatest Pulling Power of Any Low-Priced Truck

CHEVROLET
FOR ECONOMICAL TRANSPORTATION

Chevrolet truck power and economy give unmatched service on combination truck-compressor units used in road and street repair. The compressor unit is operated with smooth, dependable Chevrolet Valve-in-Head Engine power by means of a power take-off installation.

See your Chevrolet dealer for complete information on Chevrolet trucks and passenger cars for the following state and municipal transport uses: POLICE SCOUT CARS • POLICE PATROL WAGONS • HIGHWAY CONSTRUCTION AND MAINTENANCE • GARBAGE COLLECTION • COMPRESSOR UNITS • PARK AND BOULEVARD SERVICE

State, county and municipal road construction and street maintenance jobs demand trucks of durable strength and great pulling power. No low-priced trucks supply these qualities so completely as the new 1937 Chevrolet 1½-ton truck models do. They not only supply *unequaled pulling power*—important in any operation where heavily loaded dump trucks are depended upon for quick, economical completion of the work—but offer famous Chevrolet dependability, with massive, ruggedly built frame, clutch, transmission and axle. Less gas and oil consumption and less upkeep expense result in big savings—economies that often justify the replacement of old equipment that has become expensive to operate and to keep in repair.

General Motors Installment Plan—monthly payments to suit your purse.

CHEVROLET MOTOR DIVISION, *General Motors Sales Corporation*, DETROIT, MICHIGAN

"MORE POWER per gallon LOWER COST per load"

Water Department Uses Burroughs Machines

The accompanying illustrations on this page show three sections of the offices of the Water Board of Detroit, Mich. An article in the April, 1937, issue of THE AMERICAN CITY described in detail the method of handling customers' accounts in Detroit.

Among the equipment used and manufactured by Burroughs Adding Machine Co., 6071 Second Boulevard, Detroit, Mich., are: eight public utility billing machines for customers accounting, using the bill and ledger plan; four utility cash posting machines for posting credits to ledgers; four adding-subtracting machines for cash listing and abstract audit; ten adding machines for listing cash receipts in the cashier's office; and ten electric carriage and hand carriage typewriters for writing delinquent bills and miscellaneous work.

Rock Asphalt Institute Representative

The Kentucky Rock Asphalt Institute of Louisville, Ky., has selected as its Washington, D. C., District of Columbia and Maryland representative, George Hubard Massey, of McLean, Va. Mr. Massey has been with the Public Works Administration for about three years, and prior to that was consulting engineer for various engineering projects, mostly in Virginia, with headquarters at Norfolk.

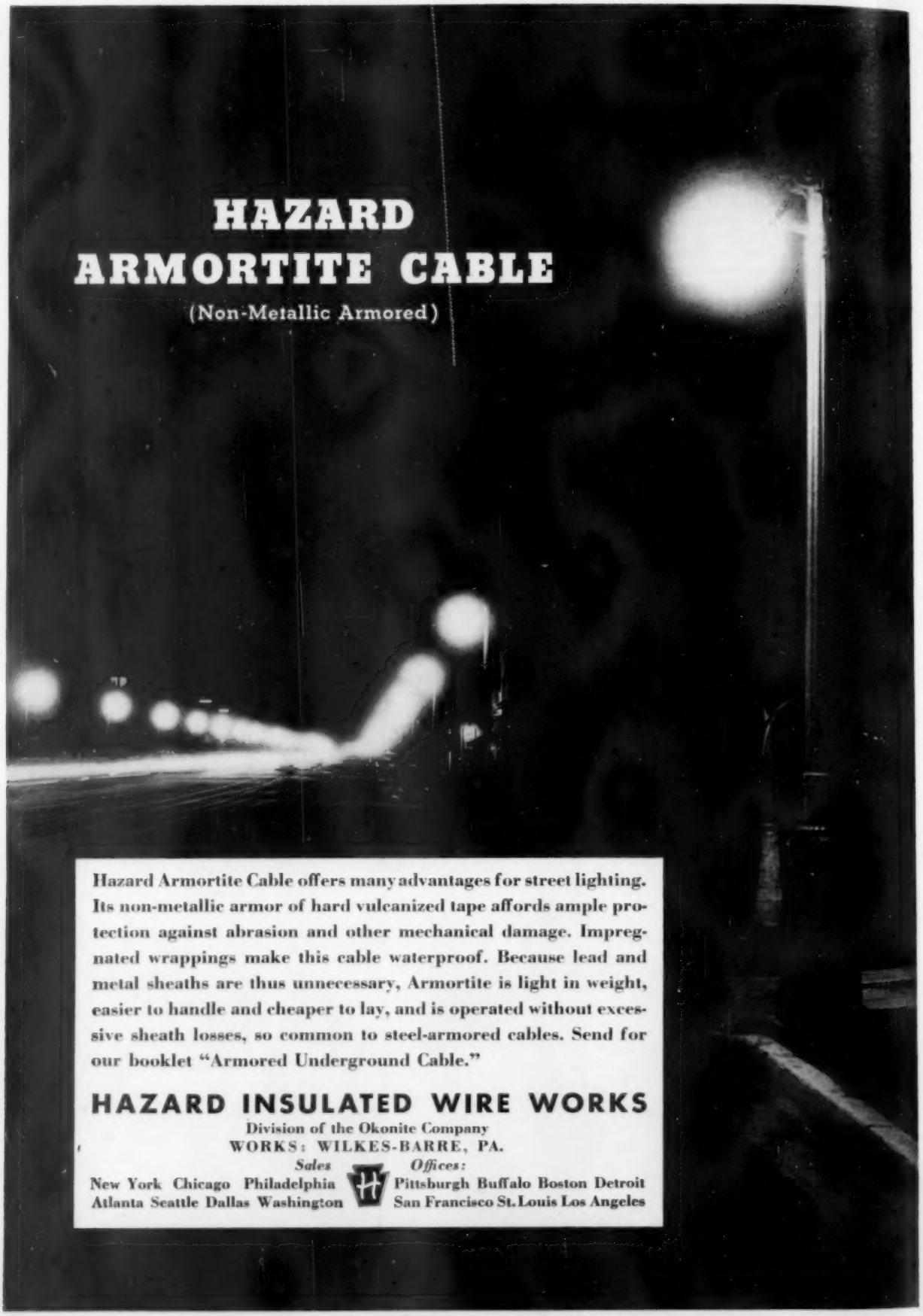
A New Flow Meter Operated Electrically

A new electrically-operated flow meter known as the Synchro-Meter has been developed by the Bailey Meter Co., Cleveland, Ohio. It consists of a transmitting unit which is operated by a Ledoux bell flow measuring mechanism of the type used in standard Bailey mechanically-operated fluid meters, and a receiver consisting of the indicating, recording and integrating instruments. The transmitter is located at the point of measurement of the variable and the receiver is located at a place or places convenient for obtaining readings from the instruments as frequently as desired.

The manufacturer states that among the distinct advantages of the Synchro-Meter are that the transmitter places only a negligible retarding force on the measuring device, and that the torque developed to operate the receiving element is very large and does not send any reaction back to the transmitter. No adjustments are necessary at the transmitting end; therefore it may be located in a relatively inaccessible place, and several receivers may be operated from one transmitter.

Complete information and a detailed description of the Bailey Synchro-Meter may be secured from the Bailey Meter Co., 1050 Ivanhoe Road, Cleveland, Ohio.

THE OFFICES OF THE DEPARTMENT OF WATER SUPPLY, DETROIT, MICH., SHOWING THE CASH POSTING DIVISION (TOP), THE BILLING DIVISION (CENTER), AND WRITING DELINQUENT BILLS (BOTTOM)



Hazard Armortite Cable offers many advantages for street lighting. Its non-metallic armor of hard vulcanized tape affords ample protection against abrasion and other mechanical damage. Impregnated wrappings make this cable waterproof. Because lead and metal sheaths are thus unnecessary, Armortite is light in weight, easier to handle and cheaper to lay, and is operated without excessive sheath losses, so common to steel-armored cables. Send for our booklet "Armored Underground Cable."

HAZARD INSULATED WIRE WORKS

Division of the Okonite Company
WORKS: WILKES-BARRE, PA.

Sales Offices:
New York Chicago Philadelphia Pittsburgh Buffalo Boston Detroit
Atlanta Seattle Dallas Washington San Francisco St. Louis Los Angeles

E. A. RUTLEDGE, SALES AND RESEARCH ENGINEER, RENSSELAER VALVE CO.

FRED H. BRUNE, MID-WEST SALES MANAGER, RENSSELAER VALVE CO.

Rensselaer Valve Co. Appointments

E. A. Rutledge has been appointed Sales and Research Engineer of the Rensselaer Valve Co., with headquarters at its General Office in Troy, N. Y. Mr. Rutledge was formerly District Manager of the company's Los Angeles Branch. He is a graduate of the University of California in Hydraulic Engineering.

Rensselaer has also announced the promotion of Fred H. Brune, formerly Pacific Coast Sales Manager, to be Sales Manager of the Middle-West Territory, with headquarters in Chicago, Ill., relieving A. E. Jones, who has retired after 45 years of continuous service with the company.

Holophane Engineer for St. Louis Territory

Chambers Andrew Patterson has been appointed Sales Engineer for the St. Louis-Kansas City territory of the Holophane Co., Inc., 342 Madison Avenue, New York. Mr. Patterson is a native of St. Louis and has had many years of experience in engineering capacities with several power companies, most recently with the Alabama Power Co. as Commercial-Industrial Lighting Engineer.

Mack Pumpers Give Grand Show on Test

A crowd of 10,000 persons in Battery Park, New York City, on May 3, saw the 19 new Mack pumpers, manufactured by Mack-International Motor Truck Corporation, Long Island City, N. Y., and just accepted by the city of New York, put on an exhibition of their pumping ability. The new units, lined up side by side with their intake hoses over the sea-wall, sent great streams of water as high as 150 feet in the air. These new Mack Type 21 pumpers embody several new and radical departures from former fire-apparatus design. They have been manufactured especially to conform with unusually stringent specifications for delivering 1,000 gpm at a pressure of 160 pounds per square inch; 500 gpm at 320 pounds, 400 gpm at 400 pounds; and 250 gpm at 600 pounds. These requirements are higher than those of the Underwriters.

Although cabs are sometimes part of the equipment on the fire apparatus of small municipalities, this is the first time that an enclosed cab has been incorporated in New York City fire-fighting equipment. Another distinctive feature is the installation of a windshield at the rear. This affords good protection for the firemen, and it is set on hinges so that it is raised out of the way when the hose is laid off. Straps for holding on at the rear are "subway" type, made of a composition material. They are arranged in line, suspended from an overhead rod instead of being bunched together in a cluster. The scaling ladders are now placed on a rack at the side of the body and not on an overhead rack as formerly. The hook lies flat on the body platform. Fastened to the left side of the rear platform is the spare tire.

These fire engines are special high-pressure pumpers and have six cylinder heavy-duty motors. They easily handle 1,000 gallons of water per minute from the river, and more than double that amount from the large water mains. The pumps are a new Mack design and can be made into three distinct types of centrifugal pumps by the simple turn of a wheel.

Bartlett & Snow Moves New York City Office

The C. O. Bartlett & Snow Co., Cleveland, Ohio, has moved its New York City office to Room 404-E at 30 Church Street. C. W. Ross, who has represented the company's foundry, drying, conveying and coal- and ash-handling equipment in the New York territory for more than twelve years, continues in charge as District Manager.

A SPECTACULAR DEMONSTRATION BY NINETEEN NEW MACK PUMPERS RECENTLY PURCHASED BY NEW YORK CITY

MODERN PROBLEM CHILDREN

Despite increasing traffic volume and motor car speed, daytime traffic accidents have been reduced through public education, traffic regulation, better roads and improved automobile design.

BUT . . . it is significant to note that these safety measures have had little or no effect upon the night traffic accident trend. *This has increased* . . . increased from 30 per cent to 60 per cent of the total accidents in the last 20 years.

Such a trend is significant of safety conditions which lie beyond the control of the driver . . . namely *visibility conditions*.

And today, the recognized need for better visibility conditions on the streets at night introduces a new Science of Seeing for Streets, with an entirely new street lighting technique.

WESTINGHOUSE REFLECTOLUX

Through this new technique, driver visibility conditions at night can be vastly improved through a new and efficient utilization of the light from the street luminaires. This new practice directs all of the light to the street surfaces . . . directs it in a way that the street surface becomes a brightly lighted background for all objects between the driver and the street . . . directs it in a way that is equally effective under all varying street conditions, wet and dry, light and dark.

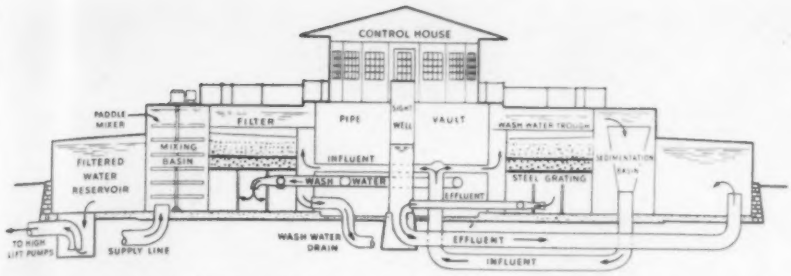
This modern street lighting system is dictated by modern motor car design plus modern traffic conditions. And it is accomplished by means of a new type of installation, and a new type of luminaire that directs the light at low reflection angles up and down the street . . . a type of luminaire like the new Westinghouse Reflectolux that features a shielded light source and *directed light control* in keeping with this new practice.

It will pay you, before making any plans or any investment, to get complete details of this modern street lighting practice, and the type of equipment and installation recommended.

Westinghouse offers you an advisory service that will acquaint you thoroughly with all details. We urge you to take advantage of this service by writing, Westinghouse Electric & Mfg. Co., Lighting Division, Edgewater Park, Cleveland, Ohio.

WHEN YOU THINK OF *Lighting* THINK OF

Westinghouse



CROSS-SECTION OF A MORSE FILTER PLANT, SHOWING THE DIRECTION OF FLOW OF WATER THROUGH THE PLANT

A Circular Filter Plant

The Morse Filter Plant, which is built entirely of steel and utilizes less ground space per million gallons of capacity than the conventional rectangular plants, is built by the Chicago Bridge & Iron Co., 37 West Van Buren Street, Chicago, Ill. A 5-mgd plant with a 2-hour sedimentation period and a 275,000-gallon clear-water reservoir can be built within a 120-foot diameter circle. The filter beds are of the rapid-sand type arranged in arcuate form within one of the cylindrical sections, usually the one adjacent to the pipe vault. The under-drainage piping is placed directly in the bottom of the filter, and the filter material is placed on a radial steel grating having 1 x 4-inch openings. This grating is supported from 3 to 6 feet above the bottom of the filter chamber and carries the first layer of large gravel placed directly on it, and then the filter sand on the gravel in the usual manner. There are no pipes in the bottom of the filter bed. The entire open space under the grating serves as an under-drain, both for carrying off the filtered water and for applying the filtered wash water to the under-side of the bed.

The method of operating a Morse filter plant is the same as that of any other rapid sand type plant, the only novel feature being the shape of the plant and the method of supporting the filter gravel and sand. Relatively small units of the Morse filter plant can be built economically, thus enabling an industrial plant or a small community to install a unit from time to time as required, without paying an excessively high cost per million gallons of capacity.

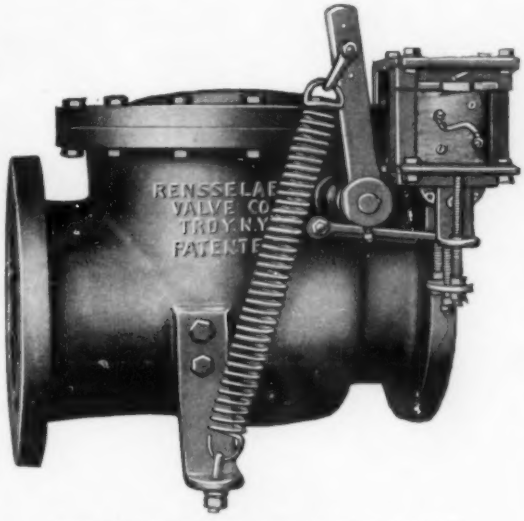
The plants may be adapted to water softening by simply installing the proper chemical equipment and designing the various compartments for the required coagulating and settling.

A 10-page illustrated booklet on the Morse filter plant may be secured by readers of THE AMERICAN CITY free on request by writing to the Chicago Bridge & Iron Co., 37 West Van Buren Street, Chicago, Ill.

A No-Slam Check Valve That Is Quick-Closing

The new Rensselaer Clearway check-valve has been designed to provide a full, clear passage for the flow of water, giving a low head loss even in high velocities. In addition, the check-valve operates without a slam when the pump is shut down.

The operation of the Rensselaer Clearway check-valve is simple and direct.



THE RENSSELAER CLEARWAY CHECK VALVE

When the pump motor switch is closed, starting the pump, a solenoid on the check-valve is energized, pressing the latch to the latching cam surface by spring tension. As water starts to flow, the check-valve flap is carried from its seat, rotating the main hinge pin. The rotation of the main hinge pin operates a four-way valve, permitting pressure equal to the pumping head to pass to the under-side of the plunger of the lifting cylinder. The plunger of the lifting cylinder comes in contact with the lifting arm which is attached to the main hinge pin, carrying the check-valve flap to the full open position against the energy developed on the lever arm by the closing spring. As the plunger of the lifting cylinder reaches the top of its stroke, the latch engages the latching cam, holding the flap open while the plunger of the lifting cylinder automatically returns to the down position.

When the pump is shut down, or in case of power failure, the solenoid immediately becomes de-energized. The spring-loaded core of the solenoid hits the latch a hammer blow, releasing the flap, which is carried quickly and quietly to its seat by the lever arm and the closing spring.

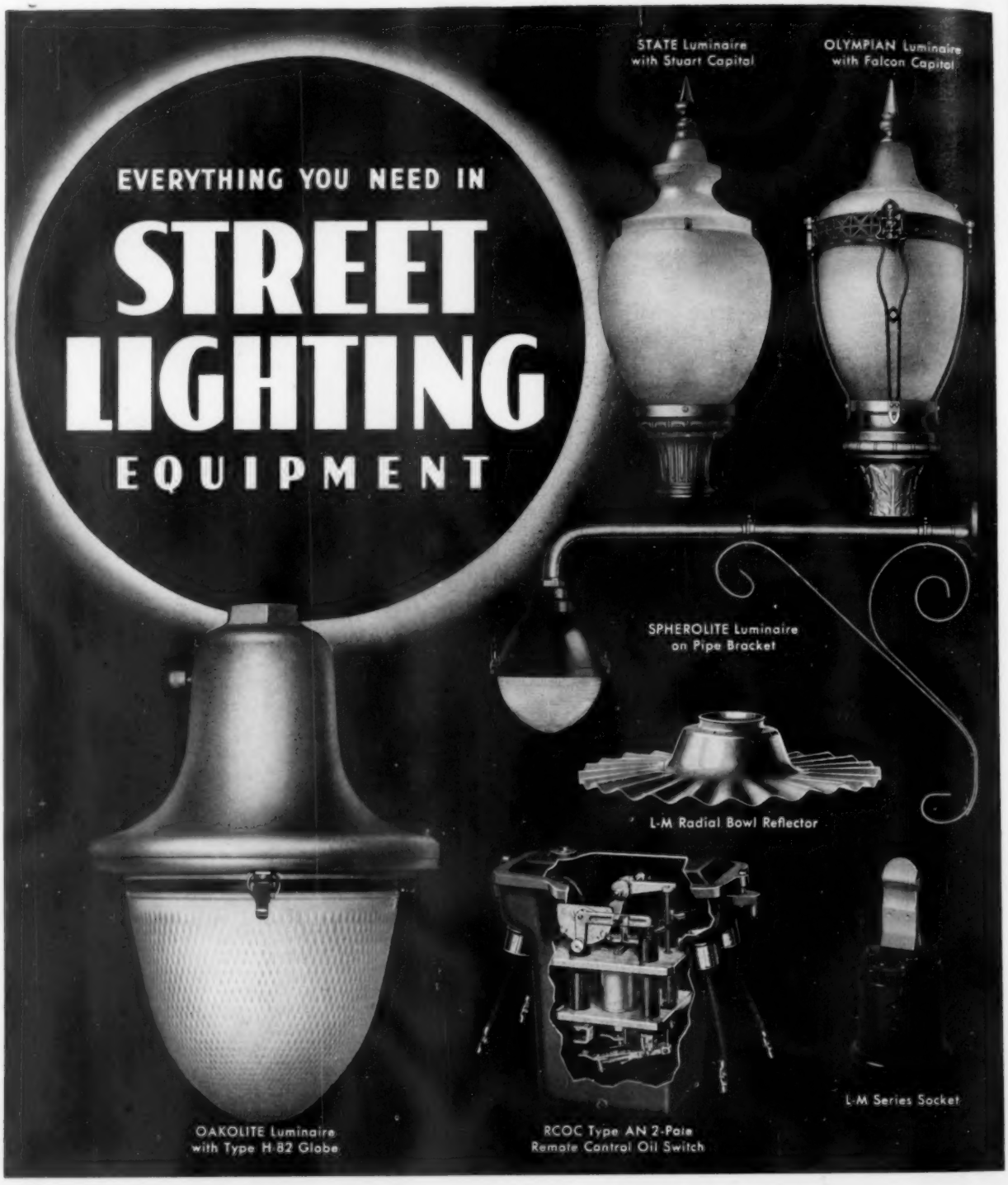
This check-valve is made in two general designs: the Straight-Thru pattern with the inlet and discharge diameter the same, in sizes from 8 to 12 inches; and the Increasing-Type check-valve with an inlet diameter from 3 to 12 inches and discharge diameter as large as 16 inches. The Increasing- Type check-valve should be used wherever possible, as it has the advantage of small flap diameter, which is a valuable feature in the elimination of slam.

The Clearway quick-closing check-valve is made by the Rensselaer Valve Co., Troy, N. Y.

Trailer Dump-Cart for Hauling Materials on Lawns

A rocker trailer dump-body cart which makes a very useful accessory for hauling loam, sand, fertilizer and other material over lawns, fairways, greens and other turf-covered areas, is made by the Worthington Mower Co., Stroudsburg, Pa. This cart is made of 1/8-inch gage steel, and its exclusive rocker-slant shape makes a tail-board unnecessary. The body holds 1 cubic yard and is dumped by pulling a release lever within easy reach of the driver's seat. When the load is dumped, the tractor is started, the operator steps on the brake, and the body rocks back into latched hauling position. The flanged steel wheels of the trailer cart are made with a 10-inch tread or for large pneumatic tires, neither of which will harm turf even when the body is fully loaded.

THE WORTHINGTON TRAILER CART IN DUMPING POSITION


EVERYTHING YOU NEED IN
STREET LIGHTING
EQUIPMENT
STATE Luminaire with Stuart Capitol
OLYMPIAN Luminaire with Falcon Capitol
SPHEROLITE Luminaire on Pipe Bracket
L-M Radial Bowl Reflector
OAKOLITE Luminaire with Type H-82 Globe
RCOC Type AN 2-Pole Remote Control Oil Switch
L-M Series Socket

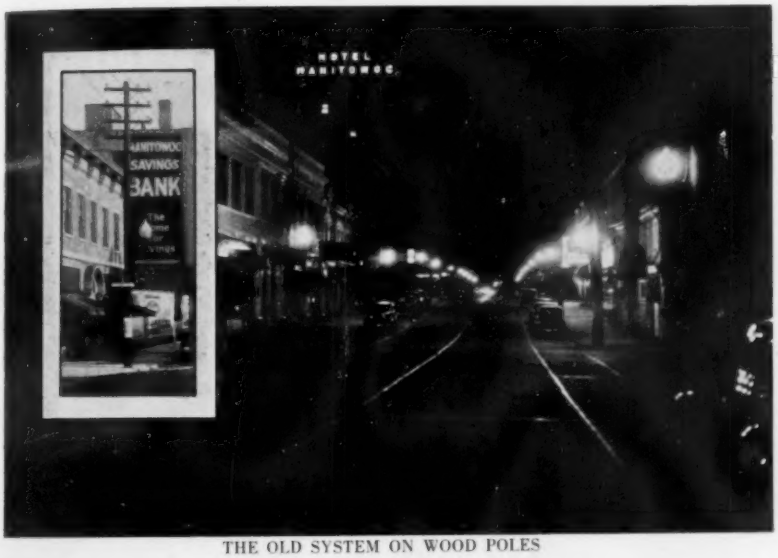
● Whether your illumination problem involves downtown streets, a residential area, a playground or highway . . . L-M Street Lighting Equipment is the sound solution. L-M Illuminating Engineers will gladly cooperate with you in selecting and planning your installation. Write to South Milwaukee, Wisconsin, for the L-M Street Lighting Catalog and Glassware Bulletin, LMB 2361.

LINE MATERIAL CO.

Outdoor Lighting

A Section of THE AMERICAN CITY
Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

Manitowoc's Ornamental System Replaced and Wires Put Underground



THE OLD SYSTEM ON WOOD POLES

THE NEW UNDERGROUND SYSTEM—DOUBLE WATTAGE GIVES FOUR TIMES THE LIGHT

By F. L. CARL
Westinghouse Electric & Mfg. Co., Cleveland, Ohio

EARLY last spring the city of Manitowoc, Wis., decided to repave Eighth Street from Washington to State, one of the main business streets, and remove all overhead wires and ornamental lighting fixtures supported by iron brackets on wood poles. The overhead primary and secondary street lighting and telephone cables were carried on cross-arms and heavy poles.

The ornamental street lighting consisted of a heavy cast-iron bracket mounted sixteen feet above street level with an upright luminaire and refractor. Each unit was equipped with a 6,000-lumen, 20-ampere lamp through an individual pole type transformer fed from a 6.6-ampere primary series system.

The 57 new lighting standards are octagonal, reinforced centrifugally-cast concrete having a light center of not less than 21 feet and equipped with a graceful double-concrete reverse-curve bracket. The two lighting units hang from the brackets, spread 4 feet on centers.

The pendants on the street side are now equipped with 115-volt, 300-watt multiple incandescent bulbs and those on the sidewalk side are at present 200-watt bulbs, the unit rated 8,740 lumens. The entire system, however, has been designed so that at any time bulbs up to 500 watts can be installed without making any changes in the wiring. It is estimated that 0.45-footcandle average along the center line of the street surface, or four times the illumination previously obtained with 6,000-lumen series lamp and upright fixture—about four times the light for less than twice the wattage.

It was decided after considering the cost and the relative merits of a multiple and a series lighting system that multiple

it should be. Deciding factors were: the cost of individual transformers and cable; flexibility; safety; pendant fixtures; and metering advantages.

The feeders are No. 2 super-aging, 600-volt, single-conductor wire, in two sections, respectively, 1,100 feet and 1,800 feet. Two conductors serve the part-night and the all-night circuits with a common solid neutral. The control equipment consists of a multiple series switch for the all-night lamps and a time switch for the part-night, each operating an overload contactor.

All the underground secondary distribution is single-conductor, non-aging rubber compound wire, having high waterproof qualities, no lead covering being used. On high tension, 4,000-volt lead-covered cable is used.

The new system was lighted for the first time during the convention of the Wisconsin League of Municipalities.

Minnesota and Lake City Cooperate in Lighting

THE state of Minnesota is furnishing 25 lighting units on the outskirts of Lake City, Minn., on U. S. Highway 65, while poles, wire, labor, operation and maintenance will be furnished by Lake City. Along the residential area on the highway, 14 ornamental incandescent fixtures will be installed. Beyond are the other 11 units, which are sodium vapor.

Cheaper Floodlighting with Sodium Vapor

BECAUSE of its advertising value and economy, W. W. Wildman, Westinghouse illuminating engineer, predicts a rapid increase in the use of sodium vapor for floodlighting. At the company's engineering building in Bloomfield, N. J., 800 watts were used to illuminate a concrete façade of 12,000 square feet. Averaging 4 hours of burning nightly, the annual electricity cost at 5 cents per kwh should amount to $58, which is only 16 cents per night. This installation has four floodlights, each operating 1,460 hours, requiring a replacement of only three lamps annually.

Tyler City Installs Lamps on Overpass

THE longest stretch of sodium safety lighting in Texas will be along the Dallas-Tyler highway on a new overpass and its approaches at Tyler. The 25 new lights are scheduled for operation from June 1, according to Oscar Burton, of the Tyler City Commission. The city pays for the installation and maintenance of the units.

On the overpass, units will be mounted on standards 23 feet above the roadway, and staggered 110 feet apart. On the approaches the units will be staggered 160 feet apart.

Decision to use the sodium units was made following a visit to Kerrville, Texas, where the Tyler City Commission saw the first installation of sodium lights to be made in the state. These units light a new bridge recently completed across the Guadalupe River.

Sodium Vapor Lamps on B.P.R. at Greenwich, Conn.

A SIX-MILE stretch of sodium and incandescent safety lighting along the Boston Post Road from the New York State line to the Stamford town line has been installed by the Connecticut Light and Power Co. for the township of Greenwich. Ninety-four sodium-vapor units light the four-lane thoroughfare outside Greenwich and Cos Cob, while in the towns new incandescent units have been put in operation.

Says O. F. King, Jr., Executive Secretary of the Governor's commission on street and highway safety: "Connecticut motorists now have the opportunity of driving under the first long stretch of sodium and incandescent safety highway lighting, and of really knowing what safety lighting is like. The township of Greenwich and its officials are to be complimented on this pioneer movement towards greater night safety."

Want Lighted Approaches to Oregon Cities

OUR group has made a thorough investigation of the benefits derived from illuminated highways, studying particularly the stretch of lighting on the Pacific Highway just outside Tacoma, Wash. Our members want modern safety lighting systems, providing long-range visibility and suppressing glare, on the dangerous highways contiguous to their cities. They want to make these highways safer for motorists at night.

Other safety objectives recommended are: distinctly-marked sections of the highway where vision is impaired and passing dangerous; markers for indicated speeds in congested areas; "Keep to the right" signs on all highways; warning signs standard in size, color, and position; teaching of highway safety in public schools; laws enforced from the viewpoint of safety, not revenue; statewide inspection of motor cars; a uniform traffic code for pedestrians; drivers' schools for those who wish to improve their driving; no left-hand turns in metropolitan areas.

RAY CONWAY,
Secretary, Oregon State Motor Association.

Wholesale Life Saving

BY the installation of adequate highway illumination, thousands of lives could be saved in traffic accidents. In fact, the five-year plan announced last year by the National Safety Council is designed to save 7,600 lives a year, or 38,000 by 1940.

Today there are 50,000 miles of highways that need immediate lighting if we are to stem the rising tide of night accidents. The lighting equipment installed would cost only a little more than 5 per cent of the original cost of the highways themselves. The annual cost of adequate highway lighting would be $1,500 per mile, and if installed for only 20,000 congested miles needing this light, would total $30,000,000 annually, including power and maintenance and capital charges. But to the taxpayers it would mean a net saving of $45,000,000 annually in what they pay directly and indirectly for accidents.

With respect to future highway lighting, the several years of experience based on experimental installations using the new sodium-vapor and mercury-vapor light sources indicate that this practice will be the standard within a year or two or whenever the taxpayers assent to the necessity of established lighting systems, just as we now have in cities. The extremely high operative efficiencies which we can obtain with metallic vapor illuminants constitute a big factor in the acceptance of highway illumination.

G. BERTRAM REGAR,
President, Illuminating Engineering Society, 900 Sansome Street, Philadelphia, Pa., at a meeting of the New England Section in Boston.

Double Lighting at Dixon and Emporia

DIXON, ILL., will modernize the lighting of its entire business section with 134 new luminaires equipped with 4,000-lumen incandescent lamps mounted on fluted heavy-duty poles spaced 100 feet apart on both sides of the street. According to General Electric engineers, they will give a symmetric distribution of light and put 55 per cent more illumination on the street than do the older luminaires.

A new white way incandescent street-lighting system in Emporia, Kans., doubles the light output of the existing series incandescent system with its 234 1,000-lumen units mounted two on a pole along the main business street. In the new system, 90 luminaires, equipped with 6,000-lumen incandescent lamps and refractors, are mounted on steel standards, one unit to a standard. The poles are spaced from 85 to 117 feet apart and opposite along 11 city blocks. All wires and cables for the new system are underground, giving the main business street a much neater appearance. Poles and all electrical equipment are furnished by the Kansas Electric Power Co.

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Park and Parkway Improvements in New York City

(See pages 43-45, this issue)